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News of the Industry Begins Page 134

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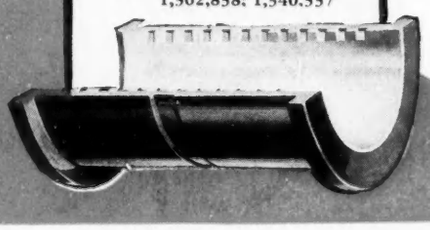

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The AUTOMOBILE

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Established 1902

Vol. 61 No. 4

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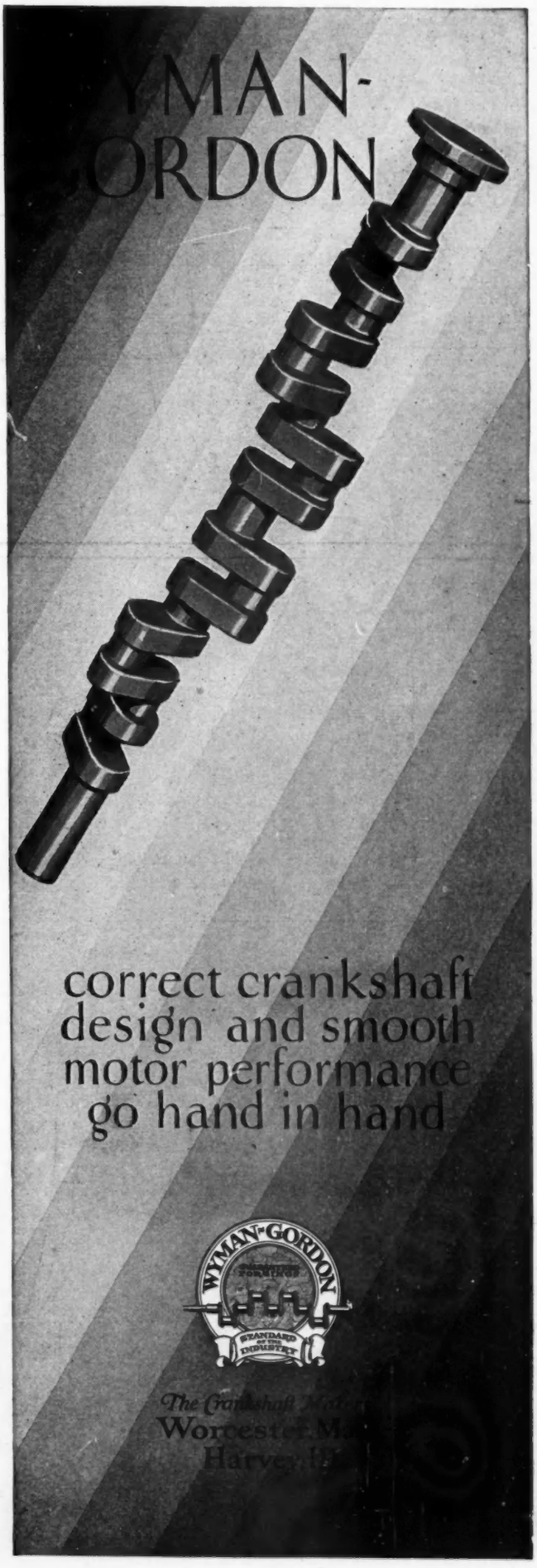

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AUTOMOTIVE INDUSTRIES
VOLUME 61 *Philadelphia, Saturday, July 27, 1929* NUMBER 4

New Tariff Might *Reduce Exports,* Some *Executives* Think

Fear extremely high duties on certain items will make foreign nations disinclined to buy our automotive products.

By NORMAN G. SHIDLE

SAID Will Rogers the other day: "Protests against the new tariff bill have been filed by twenty-eight nations, including the United States." Like most of Rogers' witticisms, this one contains more truth than poetry.

And thus far, we think it is fair to say, many responsible United States citizens haven't made all their protests publicly. The automobile industry, with its relatively stabilized domestic market for passenger cars, and its strong reliance on continued foreign trade expansion to maintain its growth and prosperity, for example, has protested feebly, if at all, in any public way against a bill which, if passed, bids fair to make automotive export selling a far harder job than it ever was before.

Individually and informally there are few automotive executives to be found with a good word for the general tariff bill as it stands today. Officially and collectively, silence on the subject has been the general order of the day. Probably on no problem so vitally affecting its future welfare has the automotive industry remained so discreetly silent in its collective capacity as in regard to its honest opinion of the proposed Hawley tariff bill. This conclusion is inevitable after personal conversations with many executives, important in varied phases of the industry and concerned with export as well as with domestic marketing policies and problems.

Industry's Position Clear

As regards the tariff proposals directly affecting automobiles and trucks, the position of the industry has been definitely stated and definitely clarified. Alvan Macauley, Alfred P. Sloan and Walter White made perfectly clear the matured ideas of the industry in the testimony which they gave before the Senate Finance Committee two weeks ago.

Reduction of duty of passenger cars from 25 per cent ad valorem to 10 per cent ad valorem with retention of the countervailing clause and retention of the present duties on trucks were advocated by these representatives of the industry. And there is good reason to believe that their ideas—or something very like them—will be found finally to have been written into the tariff bill when it is presented to President Hoover in its final form. It seems reasonable to expect that the Edsel Ford idea of completely removing the duty on passenger cars will not be incorporated in the bill in its final form.

Consequently, as regards the directly automotive phases of the bill, the industry and individual executives in the industry seem to see no just cause for serious alarm.

Nearly every responsible executive privately questioned, however, has exhibited serious concern about the proposed increases in tariff on many items which in the past various foreign countries have sold to the United States in considerable volume. The definite increases proposed on many of these items, it is argued, is certain to cut down United States imports, have an appreciable tendency to further restrict buying power in those countries which have been exporting to us, raise against United States products considerable ill will in those foreign exporting nations, and thus result in very definitely increased sales resistance for American automotive products of all kinds.

There are those, of course, who sincerely believe that these possible commercial dangers are being greatly exaggerated in the minds of some exporters. Our imports have continued to increase during the last few years, this group points out, despite the presence of a protective tariff. Regardless of theories and apparent logic, they argue, the figures prove this to be the case. President Hoover himself, prior to his election, was among those who brought to light and emphasized

this fact, which is derived from official records.

There is a great difference, however, certain automotive executives point out, between a protective tariff such as we have had for some time and the sort of tariff barriers which are being proposed on many important products in the new bill. Well-informed sources, in fact, believe that President Hoover is far from being at one with many of the provisions of the bill as it stood when it passed through the House.

Even admitting that the uproar which the bill has caused in scores of foreign countries is based partly on misinformation, partly on a tendency to jump to conclusions and partly on prejudice, competent automotive observers privately voice the belief that there can be no question about the reality of the possible adverse effects of these protests eventually so far as export sales of automobiles, trucks, parts and accessories are concerned.

While the very recent and, doubtless, temporary decline in our motor vehicles exports is attributed chiefly to inability of several important makers to supply enough cars to meet the demand, it does cause sincere contemplation of a situation which, if it became a permanent tendency, might have serious effects on the earnings of our domestic manufacturers.

It seems significant also that those automotive men who privately emphasize the dangers most have, in our experience, been those whose knowledge of the foreign situation is close, recent and constant.

Executives' Views Emphatic

For obvious reasons of domestic policy and expediency, most of these men object to being quoted publicly as regards their views, but those views are none the less emphatic. Detailed survey of the opinions of all the important foreign representatives of one big automotive export unit recently developed a unanimous belief on the part of those representatives that passage of the tariff bill in its present form might seriously contract their sales possibilities during the next year or two.

Typical of studied opinion among parts, accessory and shop equipment men is that of George L. Brunner, general manager, Brunner Manufacturing Co., who returned only a month or so ago from a business trip through a number of European countries. On his return, Mr. Brunner said:

"I found very bitter feelings in every country I visisted against the tariff bill as now proposed in Congress. The business concerns of this country are spending millions to promote foreign trade and commercial reations with other countries. The rest of the world owes us billions in war debts and loans for the rehabilitation of other countries. How in the name of common sense can we expect the rest of the world to pay this indebtedness in addition to purchasing our merchandise unless we, in turn, purchase their products is more than I can understand.

"Certain industries should have, and are entitled to, protection due to peculiar conditions surrounding them. Cases of this kind are justifiable and will not be opposed seriously by any country against which such a tariff is effective. On the other hand, if we build a tariff wall so high that all foreign merchandise is prevented from coming in here, a dangerous situation of far-reaching consequence will result.

"When I was in Switzerland early in May, meetings were being held by the industrial concerns who are the largest consumers of American trucks, with a view to a boycott against American products of all kinds, but of American trucks in particular.

"In France 500 chambers of commerce were holding meetings to protest and to look for means of definite adverse action against all American products.

"In every country I was in, similar hostility was manifested to a greater or less extent in conversations I had with many business men in all these countries."

It has not been difficult, as a matter of fact, to find automotive men in every part of the field who would subscribe to the following statement appearing in a *New York Times* editorial last week, which read:

"Daily notes of warning come from Europe and South America, from the Philippines and from Cuba, which our lawmakers would be stupid if they did not heed. The formation of a European Customs Union, with special reference to defense against American commercial invasion, is again actively discussed. Then there is the renewed movement for preferential trading within the British Empire. That might easily be made a weapon against any American monopolistic policy. . . . . All over the place, in fact, are lying edged tariff tools . . . . with which Washington had better be careful how it plays."

The most outstanding specific analysis of the new tariff bill, from a definitely automotive viewpoint, appears in the August issue of *The American Automobile* (Overseas edition), and has been written by George E. Quisenberry, editor of that publication. Mr. Quisenberry's explanation of certain generally misunderstood phases of the balance of trade is particularly pertinent and worth close study by every automotive executive. He presents many facts which should have the studied attention even of those who see the greatest dangers in the present tariff bill. He says in part:

Trade Balance Practically Even

"Despite an excess of about a billion dollars of merchandise exports last year to all countries of the world, and despite the payment to the United States of an approximate two hundred millions gold on war debts, the American position in 1928 was practically that of an even balance. In other words, the outgo of currency almost balanced the income. The exact figures of the Department Survey, boiled down to their essentials, show that in a total of, roughly $4,500,000,000, the balance favorable to America was forty millions gold. That is, slightly less than one-tenth of one per cent.

"To most readers of this magazine, both abroad and in America, this statement will be astonishing. It must be explained, if it is to be believed.

"First of all, there are many countries and territories from which America imports much more than it sells to.

"There is, too, the very important matter of tringulated trade. which, to some extent, offsets the apparent

direct trade position. For example, the large American market for South African diamonds is not supplied direct from South Africa, but rather from Europe and, accordingly, the American wealth poured out for the precious stones must filter its way back to South Africa through one or more European countries. The same is true of Australian and New Zealand wool, which, exported to England, is there fabricated and finally shipped, in great quantity as woolen textiles, to America for clothing,

"If this wool came to America direct from Australia, or New Zealand, the position of America's trade with Australia would apparently be improved, a trade which, on the face of it, is sadly misbalanced. On the other hand, by fabricating the wool in England, several things result highly favorable to Australia, or New Zealand, and the British Empire. There is the toll of shipping, the wool being almost always carried in British ships, and the employment given to textile workers in Great Britain, who thus are enabled to buy more heavily of New Zealand butter, Australian wheat, meats, etc. If the raw wool were shipped direct to America, thus to improve the apparent American position in Australia, it would be fabricated by American workmen who would not be buyers of Australian and New Zealand food and other products.

"Trade is even quadrangular, through three, four or more countries.

"International trade is far too complex for an easy understanding. An unexpected revelation is that the 1928 trade of America with the eight territories of Australia, New Zealand, British India, Mayala, Ceylon, South Africa, British East Africa and British West Africa was unfavorable to the States by 150 millions gold. Any endeavor to calculate the financial position of a country solely on the basis of its direct exports and imports shows a lamentable lack of information as to 1929 world economics.

"What then is it that makes the American international position at a practical balance?

International Position is Complex

"So much of the American international trade is in the so-called 'invisible' exports that this stupendous factor must be explained, regardless of the difficulty in doing so and the space required. The term 'invisible' is applied, by economists, to those things in international trade and finance which do not go through a customs house for record, as is done with merchandise. Any passage of money from one country to another, other than merchandise, is an invisible item in its trade. Herein is the factor commonly disregarded in the 'sleight-of-hand' gestures that have been made so many times recently.

"Were it not for one specific product, of which America is the chief and practically the only large provider for the world, the direct merchandise trade balance of this country would be at a practical balance. This product is cotton, grown in the southlands of the United States, being necessary to the textile makers of nearly every country and as the basic product of these great industries, with their hundreds of thousands of workers.

"The cotton trade is, of course, only one of the many misunderstood phases of international trade. But let this be remembered—were it not for the world demands for raw cotton, America trades dollar for dollar in merchandise. It balances its sales of automobiles, radio equipment, petroleum, specialty manufactures and other products to all parts of the world, with imports of manufactured products from Europe, rubber, tea, jute and silk, from the Orient, wool, hides and other products, from Oceania, coffee, fruits and sugar from Latin-America, etc."

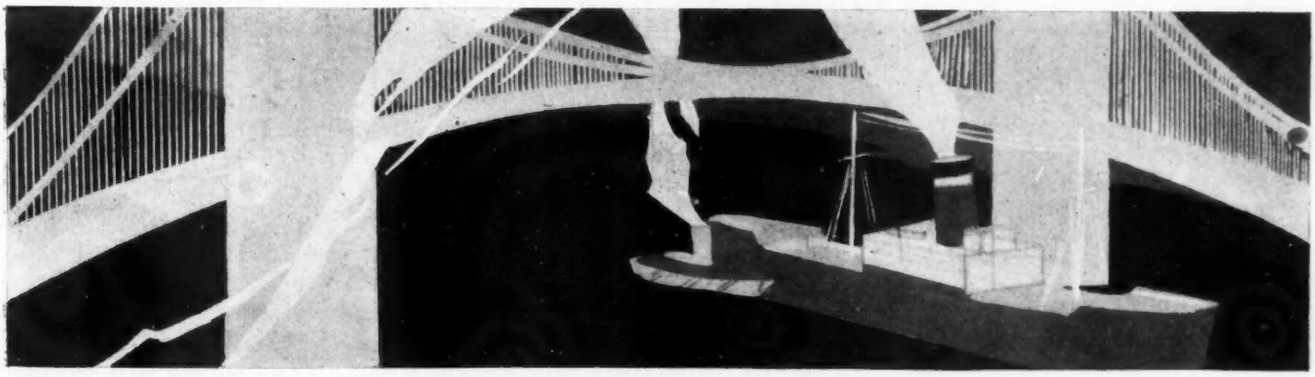
Hoover's Veto Possible

Mr. Quisenberry seems reasonably optimistic about the final outcome of the tariff measure, partly on the basis that current discussion will influence Congress to modify some of the more stringent schedules and partly on the theory that President Hoover might ultimately veto the bill should it come to him containing provisions which he considers economically unsound. Mr. Quisenberry's conclusions, in fact, may well be taken as representative of the hopes of the average informed automotive executive whose business future is to any important extent involved in the foreign markets, when he says:

"The clamor against the proposed tariff is steadily growing. It is now before the Senate undergoing hearings and revisions. Most rates are more likely to be decreased by the Senate than increased. President Hoover is reported as having threatened ultimate veto of the bill if it contains certain provisions distasteful to him, and his influence—that of a President who has the whole country behind him probably more unanimously than any President for many years—is toward limitation and less onerous duties."

As far as our own investigations have gone, as a matter of fact, there would seem to be many automotive executives whose failure to enter publicly into the tariff argument except where it affects strictly automotive products, is based largely on an abiding faith in the economic perspicacity and the personal influence and intelligence of Mr. Hoover.

Among the most outspoken executives on this subject, perhaps, are Messrs. Henry Ford and Edsel Ford. Both of them definitely and clearly put themselves on record as being in favor of placing automobiles and trucks on the free list in so far as the Ford industry is concerned, in a letter received this week by Senator David A. Reed, Republican, of Pennsylvania.



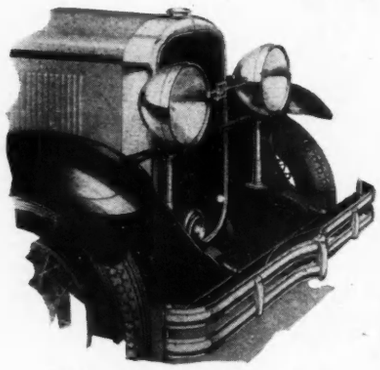
Buick Models for 1930, *Improved* And Marles "*Hour Glass*" Worm

Rumors of straight eights, V-eights, set at rest with announcement of but still retaining former

By ATHEL F.

ALL of the rumors regarding straight eights, V-eights and L-head engines which the Buick Motor Co. was supposed to be developing were set at rest with the first public showing of the company's 1930 models on July 27. They are six-cylinder cars, larger, more attractive in appearance, and generally refined, but retaining all of the general principles of design which have characterized Buick cars in recent years.

Prices range from $1225 for the Series 40 business coupe up to $1995 for the Series 60 seven-passenger limousine. By comparison with former prices, a sharp decrease is made in the larger models, while the smaller cars are slightly higher. The complete list of prices is appended to this article.



View of radiator, new fenders and headlamp mounting of the 1930 Buick

The cars now are longer, the Series 40, which replaces the former 116, having a wheelbase 2 in. longer, and the Series 50 and 60, which replace the 121 and 129, having a wheelbase 3 in. longer. The overall height is about 2 in. less on all models, and the roof treatment is different, the side panels tapering in depth toward the front.

Aside from their effects on appearance, the Pines Winterfront on the new models and the sloping (7 deg.) windshield are valuable improvements from the operating standpoint, the former maintaining the engine at a more nearly uniform temperature, and the latter reducing glare and annoying reflections, especially in night driving. Improvements have been made also in the hardware, a larger number of parts now being chromium-plated, and many other refinements have been made, such as the provision of integral bumper brackets, new fender lines, new head and tail lamps, new hub caps, metal gas tank covers, larger doors and improved seat adjustments.

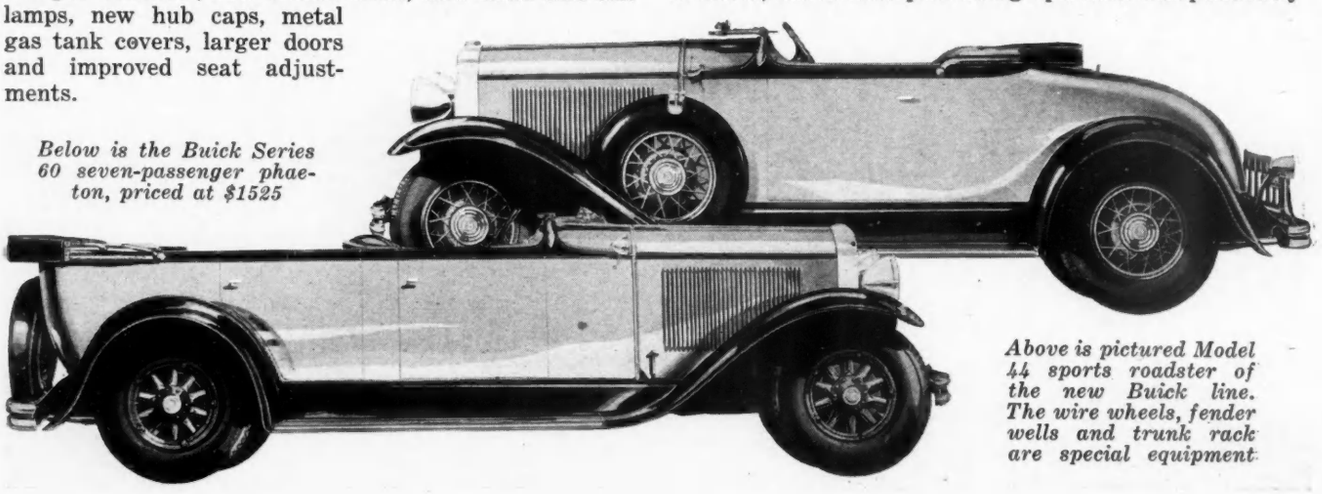
Mechanical changes made are designed chiefly to improve the handling and riding qualities. Engines of all models have a 1/8-in. larger bore, to take care of the increased car sizes and weights (150-160-lb.). A double-breaker distributor is now used; there is more rubber in all engine mountings, the radiator area has been increased, and better baffling is provided in the radiator shell, in order to prevent unnecessary overflowing of water.

To increase the clutch capacity to conform with the increase in power, the clutch springs have been made stiffer. A finer pitch (8) is used for the gears of the transmission, for the sake of more quiet operation, and the rear axle ratios have been changed to suit the new conditions of power and weight.

More important than these changes, however, are the new brakes and steering gear. The former follow closely the type now used on the Cadillac and LaSalle models, designated as the "Huck" type, and developed by the General Motors Corp. It will be remembered that these brakes are of the servo two-shoe type, cam-operated, but with the self-energizing front shoe attached to the hub plate by means of a forked link rod, the articulated mounting in effect preventing excessive self-energization and thus reducing the chances of locking wheels at high speeds.

In each of the rear-wheel drums there are two pairs of shoes, the second pair being operated independently

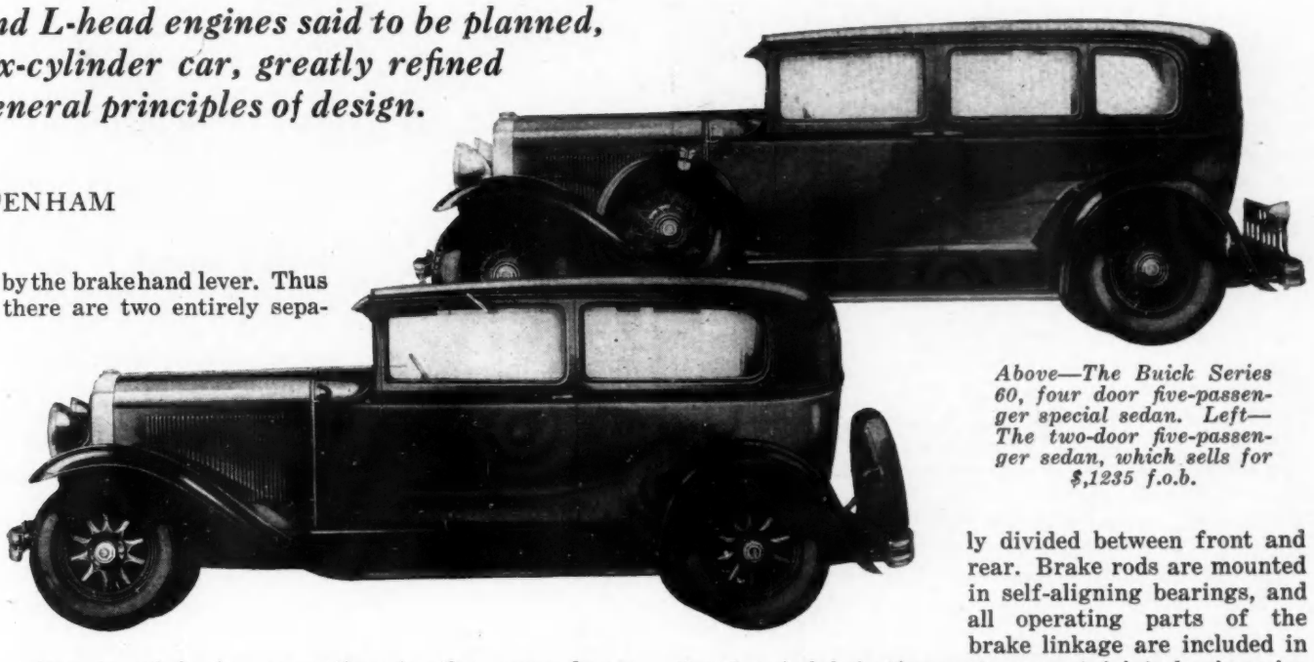
Below is the Buick Series 60 seven-passenger phaeton, priced at $1525



Above is pictured Model 44 sports roadster of the new Buick line. The wire wheels, fender wells and trunk rack are special equipment

In *Appearance*, Have Servo *Brakes* and Roller Tooth *Steering* Gear

and L-head engines said to be planned, six-cylinder car, greatly refined general principles of design.



Above—The Buick Series 60, four door five-passenger special sedan. Left—The two-door five-passenger sedan, which sells for $1,235 f.o.b.

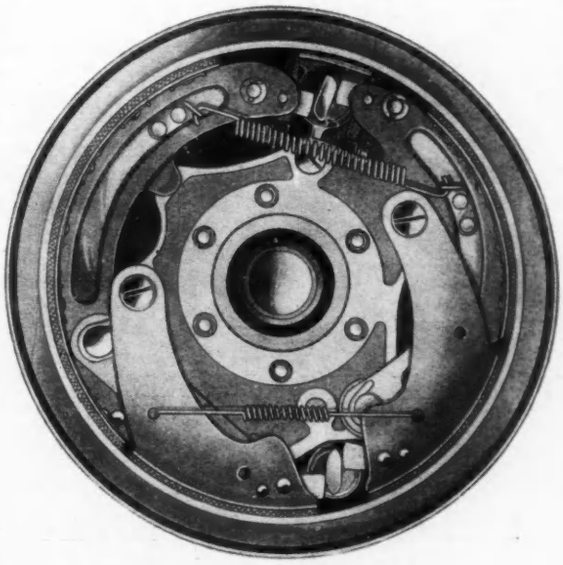
DENHAM

by the brake hand lever. Thus there are two entirely separate sets of brakes operating in the same drums. Front brakes, of course, have only the two service shoes. In addition to these characteristics, the new brakes have coiled wire springs around the outside of the drums, which not only assists in cooling the drums but are said to materially reduce the amplification of brake noises by the drums, which are thought to act as diaphragms, and a lead plate at the forward end of the self-energizing shoe in place of a short strip of lining.

Considerable research on brakes has indicated to Buick Motor Co. engineers that to date no lining has been developed which will not score brake drums. But it has been found that substitution of a lead plate for a piece of the lining materially reduces such scoring, the theory being that a slightly lubricating film is applied to the drum by the lead rubbing on it. The plate is alloyed only sufficiently to permit its being riveted to the shoe and holding its shape while wearing down with the lining. One point of difference between the Cadillac and Buick brakes that it is well to mention is that the latter have pressed steel shoes, while the shoes in the former are of aluminum alloy.

The braking effort is equally divided between front and rear. Brake rods are mounted in self-aligning bearings, and all operating parts of the brake linkage are included in the chassis lubricating system, most joints having pipe lines to grease gun connections in accessible places on the chassis.

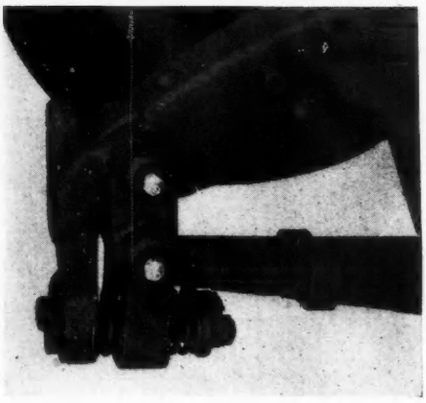
The new steering gear, which has already been mentioned, is of the Marles type, but manufactured by Jacox. This type of gear is also known as the "hour-glass" worm and roller tooth type. It renders the new Buicks exceptionally easy to steer. A steering "shock eliminator" is mounted on the left front spring of the new cars. This device consists of a shackle at the front end of the spring in addition to the regular rear shackle, but with its movement in relation to the front spring horn bracket limited in both directions by means of helical springs under compression. The bolts passing through these springs and locating the shackle normally with respect to the frame horn bracket serve as a means of adjustment of the spring initial compression. The device is said to eliminate road-shock and shimmying tendencies. Tie rods have forced ends with ball and socket joints, and are provided with screw adjustment instead of the former shim type.



Side view of the brakes used on the rear wheels of the 1930 Buicks

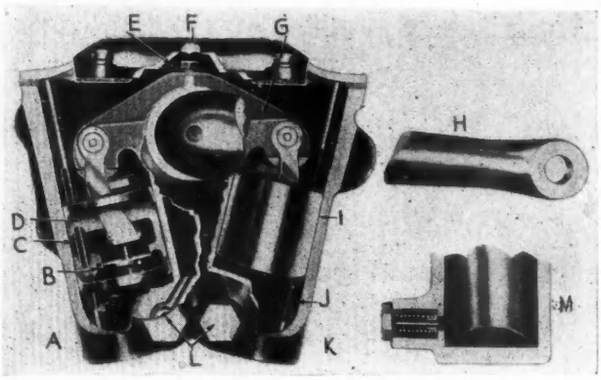
Important changes have been made in the suspension system. Buick has dropped its cantilever type rear springs

and substituted semi-elliptics, and coincident with this change, has adopted Delco-Remy double-acting hydraulic shock absorbers, similar to those first introduced on the present series Cadillac. The semi-elliptic springs also permit of the use of wider frames, resulting in increased stability of the body, and the wider spring centers also have made it possible to eliminate the former axle truss rods, although the torque-tube type of drive is retained. With the use of double-acting shock absorbers it has been possible to decrease the clearance between frame and rear springs about an inch, without danger of having the axle "strike through."



Steering shock eliminator on the front spring of the 1930 Buicks

Frames on models have been strengthened by increasing the channel depths and widths of flanges. Front axle ends have been strengthened in view of the increased maximum brake torque, and the knuckle pin axes now intersect the ground closer to the centers of tire contact, which is expected to render steering easier and increase tire life.



Sectioned view of double-acting shock absorber on the new Buicks. At A is the compression side, B—intake valve, C—metering pin, D—piston, cut away, E—oil level, F—Filler plug, G—cam, H—arm, and M—section through relief valve

Buick 1930 Specifications

Model designation	40	50-60
Wheelbase	118	124-132
Tire size	29 x 5.50	31 x 6.50
Bore and stroke	3 7/16 x 4⅝	3¾ by 5
Piston displacement	257	331
Maximum hp.	80.5 @ 2800	98 @ 2800
Compression ratio	4.3	4.3
Valve arrangement	in head	in head
Camshaft drive	gear	gear
Piston material	cast iron	cast iron
No. main bearings	4	4
Crankshaft counterbalanced?	yes	yes
Vibration damper	none	none
Oil pressure to main bearings	yes	yes
Crankpins	yes	yes
Camshaft drive	yes	yes
Piston pins	no	no
Camshaft	no	no
Oil cleaner make	AC	AC
Air cleaner make	AC	AC
Temperature control	auto. shutters	auto. shutters
Carburetor make	Marvel	Marvel
Fuel feed	AC pump	AC pump
Electrical units	Delco-Remy	Delco-Remy
Battery	Exide	Exide
Engine mounting	rubber	rubber
Clutch type	multiple disk	multiple disk
Gearset make	own	own
Forward speeds	3	3
Universals	metal	metal
Make	own	own
Rear axle type	¾-floating	¾-floating
Make	own	own
Ratios	50/11, 48/11, 46/11	47/11, 49/11
Torque medium	torque tube	torque tube
Brakes, service	four-wheel	four-wheel
Type	"Huck" internal	"Huck" internal
Operation	mechanical	mechanical
Brakes, hand	internal rear	internal rear
Steering gear make	Jacox	Jacox
Type	Marles worm and roller	Marles worm and roller
Springs	semi-elliptic	semi-elliptic
Length, front	36⅛	36¾
Length, rear	55	58¼
Chassis lubrication	Zerk	Zerk

New Buick Prices

Buick 118 W. B.

40—2-door sedan	$1235
44—roadster	1275
45—5-p. phaeton	1275
46—coupe (bus. coupe)	1225
46-S—4-p. coupe, rumble	1265
47—5-p. sedan, 4-door	1295

Buick 124 W. B.

57—5-p. sedan, 4-door	$1495
58—4-p. coupe	1465

Buick 132 W. B.

60—7-p. sedan	$1845
60-L—7-p. limousine	1995
61—5-p. sedan	1695
64-C—country club coupe	1625
68—5-p. coupe	1675
69—7-p. phaeton	1525

Operating Costs

A BRITISH commercial undertaking, which runs over 600 passenger cars for the use of its traveling representatives and staff, has issued what is believed to be a novel form of analysis of the operating costs; this analysis enables comparisons to be drawn between the relative amounts disbursed on each item in respect to the two sizes of the car the company has in use, 12 hp. two-seaters with an open body and 20-hp. sedans. The figures apply to three years' expenditures and to an aggregate of 16,000,000 miles.

The analysis is given below in tabulated form; it should be said that before being divulged as a matter of public interest, the figures were corrected to the rates applicable in England to the private owner, present-day retail prices of gasoline, oil, tires, etc., of the best quality being taken into account in each case.

Percentages of Operating Costs

	12-hp. Two-seater %	20-hp. Sedan %
Car tax and insurance	17.5	16.7
Garage	10.0	9.2
Depreciation and repairs	41.7	50.8
Tires	6.7	5.0
Gasoline	15.0	11.6
Fuel tax (4d per gallon)	4.1	3.3
Lubricants	1.7	1.7
Sundries	3.3	1.7
	100.0	100.0

Trends in 1930 Car Designs Point to Development of *Chassis Units*

Manufacturers of high-priced automobiles have begun to turn to phases of engine refinement for superiority in sales appeal to offset buyers' cost differentials.

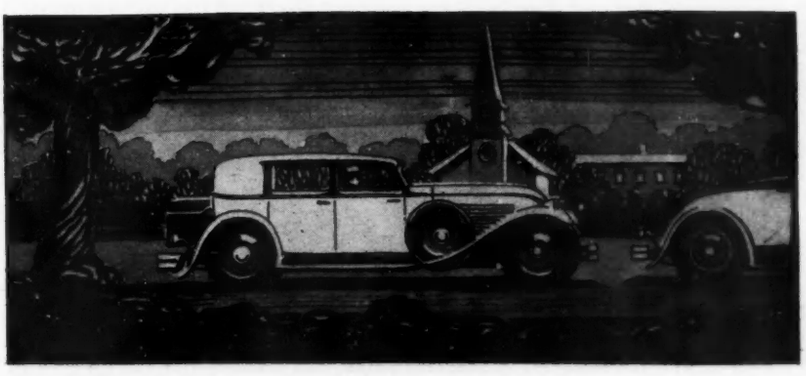
WITH more 1930 car model announcements still in the offing than at this time in the last two years, due chiefly to postponement to permit the cleaning up of inventories, and also to frequent policy alterations in some companies regarding the changes to be incorporated in the new automobiles, prognostication as to design trends in passenger vehicles has become rather difficult.

To the trained observer, however, a number of factors influencing impending changes are quite easily discernible. First of all, in the middle and upper price ranges there is a growing consciousness among manufacturers that the competition which they have to meet is no longer mainly that of comparably priced models, but that of cars in the lower price groups. The manufacturer of, say, a $1,300 car, no longer has to build his automobile to sell only in competition with other $1,300 vehicles, but must have a product which obviously presents a greater value than the $900 or $1,000 car.

Many Refinements Needed

This factor is more than likely the underlying reason for the trend of design change found in the new car models to date and what is definitely known of future models. Greater engine power no longer is the sole answer to the powerplant problem. The light sixes, for instance, have sufficient power to provide performance that can be designated as competitive with their higher-priced brethren. Manufacturers of higher-priced automobiles therefore have begun to turn more markedly to other phases of engine design for superiority in sales appeal to offset the price differential.

But more than this, they have at last begun to concentrate on the chassis. The engine in the modern automobile is probably the most highly developed unit in the entire assembly. What progress there has been made in past years in chassis units, such as brakes, steering gears, suspension, and the question of vibration and noise generally, has come frequently from the laboratories of parts suppliers as a result of competition among the latter rather than at the instigation of their automotive customers. The past year has found this condition changing. New developments in chassis design are still coming in large proportion from the parts people, but there is more cooperation on the part of the customer, and the vehicle manufacturer himself is turning his research activities more and more into chassis lines.



Body design from the appearance side during the past year has been almost at a standstill. True enough, cars have been and are being improved markedly in appearance, particularly in front-wheel drive cars, whose new lines suggest possibilities of extensive body changes. But in general, with the exception of details, the development has been entirely too conventional to give any manufacturer a body job which stands out over that of his competitors. Why? In the first place, probably because of fear that any departure from the conventional may be of such a nature that in the final analysis it will not be taken up by the public. Secondly, because of the failure of a small number of manufacturers to get more radical designs across in the past few years. And thirdly, because any successful minor innovation in lines is so quickly taken up by other manufacturers that the temporary advantage gained is dissipated quickly, and the result is that the innovation is immediately conventionalized by generalization.

Big Engines a Selling Point

With these three factors in mind the designer's job in any car plant, but especially in the middle and higher-priced groups, is no bed of roses. In the powerplants he has turned to a larger number of cylinders to provide an added selling point. The number of straight eights is still increasing, with the recent addition of the Studebaker Dictator, and the impending announcement of at least two others in place of present sixes. Vee-eights were increased in number by the introduction of the Viking, and should be supplemented by at least one more by show time if present plans materialize. These cars, however, are in the middle ranges. In the higher-priced groups there is still too much talk about 12 and 16-cylinder cars not to have some basis in fact. This development, moreover, would be quite logical since the same condition now exists for

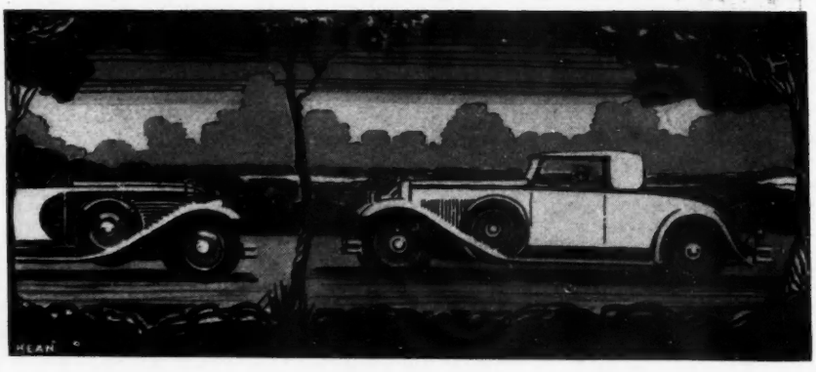
the higher-priced eights in comparison with smaller eights that was found a year or two ago in the six-cylinder field, and which resulted in the widespread adoption of eights by those manufacturers.

Those manufacturers who are not looking toward a larger number of cylinders, this year at least, for a solution of their powerplant problem are working on the refinement of their present lines to give more flexibility and greater smoothness. Thus counterweighting of crankshafts is becoming more widespread, as in the Dictator six, and also recently in another six-cylinder quantity car of slightly lower price. More rubber for engine mountings is also a definite tendency in this class, as exemplified by Buick, Jordan, and others. In this group, also, there continues to be a tendency toward larger bore engines and higher compression ratios, the latter particularly expressed by the Auburn cars with their 5.8 to 1 standard heads.

In this group also fall most of the manufacturers who are increasing their wheelbase, and the trend in this group is definitely in that direction. In clutches there is little in the way of new development announced to date. The use of insulating members between the engine and transmission incorporated in the clutch, however, continues to grow. Transmissions, on the other hand, are receiving much more attention than at any time recently. Four-speed units of the internal gear type are being very favorably considered by several manufacturers. The Dodge Senior has already been added to the list of users of such a unit, and there should be at the very least three more chassis models similarly equipped announced within the next few months. The No-back transmission reverse lock adopted in the Stutz and Peerless eight is another example of transmission development, while a tendency toward finer pitch gears for greater quietness, as in the Buicks, is also foreseen by observers.

Brakes and Axles Studied

Rear axle developments with the exception of altered gear ratios to reduce engine speeds, have been rather more confined to the manufacturing end, although more attention to correct lubrication within the housing is in evidence, and research activities on gear design and manufacture for lessening of noise is continued. Brake development, however, has been growing apace. During the past year two new types, the Bendix two-shoe, and the General Motors "Huck" type have been introduced, the first on the Hudson, Marquette and others, and the second on the Cadillac, LaSalle and Buick. Other types of four-wheel brakes are under development by independent automotive parts manufacturers. The general tendency in all types, of course, is greater efficiency with less pedal effort, together with simplification in adjustments, and decrease in the frequency of adjustment required. Drum scoring still is a rather big problem with brakes, especially those of the self-energizing type, and considerable intensive effort is being put on lining research for the elimination or reduction in importance of this problem. Buick uses a lead plate in place of part of the lining to "lubricate" the drum. Other manufacturers are undercutting the lining to reduce chatter and squealing, a condition often closely related to brake drum scoring.



Steering ease, and its commonly associated problem of shimmy and wheel fight, are getting a lot of attention, too. Probably the most interesting development is the centerpoint steering layout on the new front-wheel drive Cord. Double shackling of the left front spring to reduce shimmy and wheel fight is now found on the Packard, Hupp 8, and the Buick models. Ball and socket tie rod joints in the steering linkage, with the spring loading to provide automatic take-up for wear, is another angle from which a number of manufacturers are working to correct this problem.

Alignment Research Begun

For the first time manufacturers are beginning to find out something also about front axle and wheel alignment conditions, thanks to the focusing of this problem produced by the balloon tire and higher road speeds. An increase in the amount of rubber where it is used in spring suspension is also in evidence as well as new designed rubber shackles. Riding qualities are being improved in three directions: Longer wheelbase; longer, lower rate springs, and the adoption of double-acting shock absorbers. Also through lower centers of gravity by reduction in frame height, made possible by double-acting shock absorbers, smaller wheels and smaller diameter, larger cross-section tires.

In the engine accessories, there are found a larger number of cars equipped with fuel pumps. Double-breaker distributors for eight-cylinder engines are becoming more common than otherwise, and they are now even being introduced on six-cylinder cars. Carburetors are being more carefully calibrated and as a result in some cases are found with fewer adjustments than formerly, Buick, for instance, offering different calibrations for cars going to high and low altitude territories. Down-draft carburetors also will be introduced shortly as standard equipment.

Automatic engine temperature control through the use of radiator shutters seems to be on the increase, these shutters contributing toward the trend of providing false radiator fronts.

Detailed design developments in the bodies are found in lesser number this year than before, at least so far as the cars announced up to present time are concerned. Slightly sloping windshields have already been introduced on two cars and will be found on several others by the time show season rolls around. Adjustable drivers' seats have become more universal than otherwise, involving the elimination of the front cross seat in the four-door sedan as a body brace.

Better sealing of the front compartment is also in evidence with a wider use of dash insulating materials, draft plates around pedal openings, etc. Double and even quadruple cowl ventilators are found on a considerably larger number of cars

(Turn to page 132, please)

Just Among Ourselves

The Tariff Situation Develops New Sidelights

AS interesting as anything we have read for some time is the stenographic report of the testimony given before the Senate finance committee on July 11 by Messrs. Macauley, Sloan, White and Roberge. Most of the highlights were developed in the article by Earl Ewan, which appeared last week in *Automotive Industries*, but the detail of the testimony itself shows several sidelights which we believe have an interest value for almost any automotive factory executive and which are not altogether common knowledge. Some of these relate directly to the tariff situation; others are interesting in entirely other connections.

* * *

Reduction Offer A Futile Gesture

WE were interested, for instance, but not surprised, at the clear thinking of the automotive men as regards the possible psychological effect abroad of a tariff reduction on automobiles here. Senator King, for example, asked Mr. Macauley:

"Do you not believe that even if cars are not put on the free list that it would be a good policy—what I might denominate as a handsome gesture to our friends across the seas and in Canada and South America—for us to reduce the tariff on this item?"

To which Mr. Macauley replied (the fact having previously been developed that imports of foreign motor vehicles into this country last year reached a total of only 512):

"You ask my opinion. I think it would be a very futile gesture. France, England, Germany and other countries over there are going to look at the records. They have just the same records as we have and if we are making a gesture affecting 75 or 80 cars a year I do not think it is going to be very far-reaching."

Then Senator Barkley came to the support of this sensible automotive viewpoint by saying:

"I do not think it is very much of a gesture to reduce the tariff on something that does not come in and at the same time put the tariff up on something that does come in."

* * *

Countervailing Clause In Conflict With Treaties?

DURING the hearing, Senator Reed of Pennsylvania developed the fact that the countervailing clause (which automatically charges on automobiles a tariff equal to that charged by the exporting country on our automobiles when that duty is greater than the rate specified in our law) is thought by some authorities to be in conflict with our "most favored nation treaties" that we have with most European countries. "The Treasury Department," Senator Reed said, "I believe, has taken the position that it is not. The State Department seems to be in some doubt about it."

He pointed out, however, that "If we put it (the countervailing clause) in this bill, the enactment of the bill will override the provision of the treaties, so there will not be any question about its validity, as there is now, with regard to these treaties subsequent to 1922." (The existing tariff law was written in 1922.)

* * *

German Manufacturers Are Dependent Upon One Another

INTERESTING too was A. P. Sloan's analysis of why he believes that no one could make a car in Germany today to compete with the United States in South American markets. "It is due in the first place, "Mr. Sloan said, "to management, and in the second place to the fact that Germany has not yet really entered the automobile field.

"I think the base materials are as favorable to manufacture in Germany as they are here," he continued. "Labor, as you know, is a great deal less. Yet I believe the manufacturers are dependent on sources of supply for materials and components that do not make them independent.

"Hardly any of them make absolutely everything themselves. Therefore, the automobile manufacturer would not be dependent upon his own position in the industry, but upon the general position or attitude of mind of other manufacturers toward the problem.

"They have not progressed as far as we have. Iron castings in Germany, for instance, cost twice as much as they do here. There is no reason why they should, because the base they start from is not much different and labor is not very much of a factor in a thing of that kind. Of course, that will change with development and intensity of operation."

* * *

Marketing Formula —By an Engineer

JOSEPH LEDWINKA, chief engineer of the Edward G. Budd Manufacturing Co., of Philadelphia and Detroit, in an exclusive interview granted to humanity recently, says that automobile merchandising problems have increased to such an extent that, in order to market a car successfuly it must have specifications written by a Florida real estate man, be built by a Scotchman and sold by a philanthropist.—N.G.S.

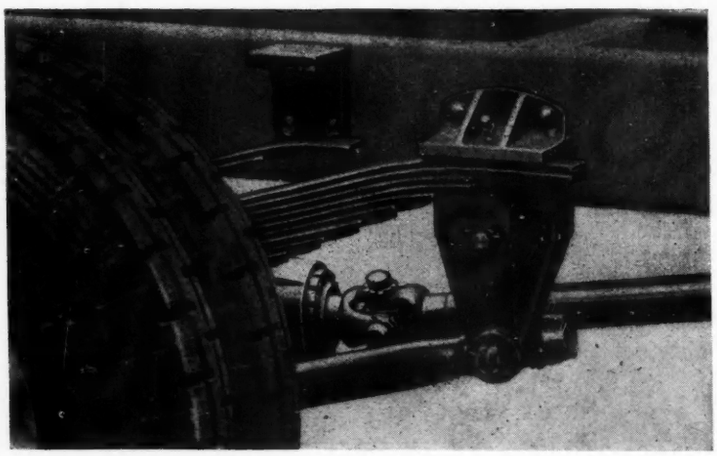
Hahn Offers Seven Truck Models, With *Six-Cylinder Engines*

View of dump body and cab on Hahn Model 67-H

New line gives complete coverage of capacity range from 1500 lb. to 5 tons, and gross weight range from 6000 to 20,000 lb.

A NEW line of trucks comprising seven models, all of which are equipped with six-cylinder engines, pneumatic tires and hydraulic four-wheel brakes, is being offered by the Hahn Motor Truck Corp., Allentown, Pa. Each model has a capacity-range rating, and in all cases except one, the upper capacity limit for one model is identical with the lower limit for the next larger truck. This gives a complete coverage of the capacity range from 1500 lb. to 5 tons and a complete coverage of the gross-weight range from 6000 to 20,000 lb.

To meet all requirements, options are offered on many items of the specifications, including wheelbases and tire equipment.



Sliding contact spring mounting and auxiliary springs as used on Hahn Model 39-H

Continental engines are used in all models, the four larger models being equipped with the R series of engines with overhead valves, which are interchangeable with respect to chassis mounting. All carburetors are Zeniths and fuel feed is by the Stewart-Warner vacuum system.

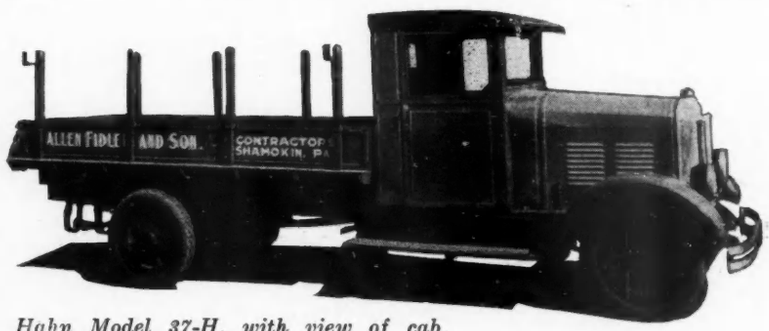
Full-floating rear axles are standard, the two larger models being fitted with Wisconsin double-reduction axles; the others with Timken bevel-gear-driven axles. Model 7-H has a Warner three-speed transmission; five models next in order of size have Brown-Lipe four-speed units, while the largest model incorporates a seven-speed Brown-Lipe transmission located amidships.

Plate clutches are used throughout, that in the 7-H being a Borg & Beck, while the others are Brown-Lipes. Other units used on all models include Timken front axles, Spicer universals, Auto-Lite starters, generators and ignition distributors, Zenith carburetors, Stewart-Warner vacuum tanks, Ross cam-and-lever steering gears, and Lockheed hydraulic four-wheel brakes.

External hand brakes on the transmission are employed on Models 7-H, 17-H and 37-H, and Tru-Stop disk brakes, made by American Cable Co., on the four remaining models. Service brakes on Models 39-H, 47-HD and 67-H are actuated by a vacuum amplifier.

Flat ends and wear plates are used instead of the conventional spring shackles on the rear springs of all models up to and including the 2½-3 ton Model 39-H. Under light loads the springs touch the frame brackets with their tips, and as the load increases the line of contact moves toward the center of the spring. The effect is a progressive stiffening of the spring. Radius rods are used in connection with the springs on all models. Ross cam-and-lever steering gears are used throughout.

Radiator shells are of cast aluminum, and Model 37-H

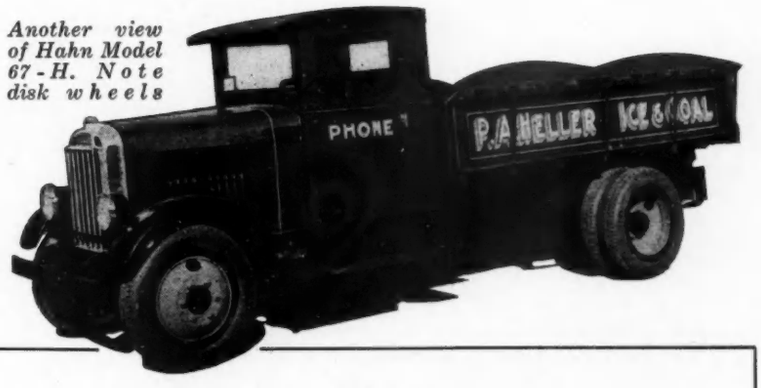


Hahn Model 37-H, with view of cab, which is standard on all chassis

is equipped with a radiator guard composed of vertical tubes fastened to angles at top and bottom. The engine compartment may be lighted by means of an extra headlight bulb in a socket on the front of the dash.

Oil filters and air cleaners form part of the standard equipment on models carrying the Continental Model R engines. Stewart speedometers and channel-type front bumpers are standard equipment on all models.

Dimensional specifications of the different models are given in the accompanying table.



Another view of Hahn Model 67-H. Note disk wheels

Principal Specifications of Hahn Motor Trucks

Model	7-H	17-H	37-H	39-H	47-HB	47-HD	67-H
Chassis price, list	$1,098	$1,430	$1,950	$2,898	$3,700	$3,900	$4,950
Capacity, tonnage rating	¾-1	1-1½	2-2½	2½-3	3-3½	3½-4	4-5
Body weight allowance	900	900	950	1200	1350	1350	2000
Maximum weight	6000	7650	10550	13000	15250	16850	20000
Chassis, weight, lb.	3100	3750	4600	5800	6900	7500	8850
Wheelbase, standard, in.	124 in.	142 in.	153 in.	164 in.	151 in.	151 in.	151 in.
			164	177	164	164	164
			183	190½	184	184	184
							198
Tires, front, standard in.	30x5	30x5	30x5	32x6	34x7	34x7	36x8
					36x8	36x8	
Tires, rear, standard	30x5	30x5	30x5	32x6	34x7	34x7	36x8
			dual	dual	dual	dual	dual
					36x8	36x8	
					dual	dual	
Engine, make and model	Con.	Con.	Con.	Con.	Con.	Con.	Con.
	29-L	18-E	16-C	16-R	18-R	18-R	21-R
Rear axle type	full fl.	full fl.	full fl.	full fl.	full fl.	full fl.	full fl.
Ratio, standard	5.8	5.8	5 5/6	6 1/6	7.8	7.8	10.8
Ratio, optional			6 4/5		6 5/6	6 5/6	8.18
Service brake							
Size of drum, front	14x1¾	14x1¾	16x2¼	16x2¼	16x2½	16x2½	17¼x3
Size of drum, rear	16x2¼	16x2¼	16x2¼	16x3½	17¼x4	17¼x4	17¼x4
Hand brake, make	Warner	BL	BL	Tru-Stop	Tru-Stop	Tru-Stop	Tru-Stop
Drum or disk?	drum	drum	drum	disk	disk	disk	disk
Diameter	8 in.	8 in.	8 in.	14 in.	14 in.	14 in.	14 in.
Springs, front	41x2¼	41x2¼	41x2¼	41x2¼	40x2½	40x2½	40x2½
Number of leaves	8	10	11	11	10	10	10
Springs, rear	50x2¼	50x2½	50x2½	50x2½	56x3	56x3	56x3½
Number of leaves	10	11	14	14	14	14	14
Wheel type	cast st.	cast st.	cast st.	cast st.	cast st.	cast st.	disk

Farm Equipment Show in Paris

A MOTOR farm-equipment exposition will be held at Buc in the Department of Seine et Oise, France, Oct. 1-6, 1929. This exposition is being organized by the French Minister of Agriculture (Central Committee on Power Farming), with the collaboration of the Minister of War. The exposition will include the following sections:

1. Oil engines adapted for various agricultural purposes. In this class there will be two subclasses, the first including all engines which have been in use for a period of at least one month by the Federation of Contractors in Agricultural Work, and the second those which have not been thus tested out but are in running order.
2. Suction gas generators of the stationary type and in running order.
3. Military trucks and suction gas generators presented by the Minister of War.
4. Portable apparatus for the carbonization of wood in the forests, in operating condition.
5. Apparatus for grinding and distributing lime-carriers.
6. Electric plowing. In this section will be contained small outfits adapted for use on moderate sized and small farms.

In general the machines and pieces of equipment should be shown in operation.

Firms or individuals wishing to exhibit in any of the groups should send for entry blanks to the Minister of Agriculture, Bureau 49bis, Paris. Entries must be made before July 16. The Minister of Agriculture, on the recommendation of the Central Committee on Power Farming, may award cash prizes to exhibitors in the different sections, but such prizes will be awarded only to exhibitors who demonstrated their products during the exhibition and only on products which were developed during the past year, or, if they were shown at previous exhibitions, were improved during the past year. All exhibitors must agree in writing that they will demonstrate their products during the show.

Automotive Industries
July 27, 1929

High-Speed *Engine Indicator* Operating on

Apparatus makes possible the working conditions, with functions of

By KALMAN J.
Assistant Professor of Engineering

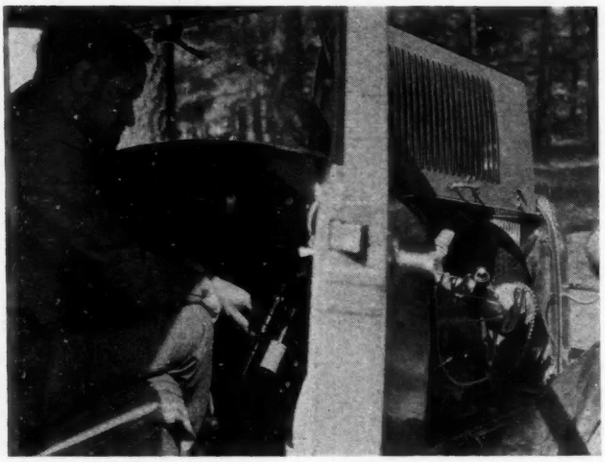


Fig. 1—Above is pictured Kalman J. De Juhasz demonstrating his high-speed engine indicator, completely assembled, during the tests described in the accompanying article

THE accompanying notes and figures describe some recent tests conducted on a Ford Model A car equipped with a De Juhasz high-speed engine indicator. These tests are believed to be the first in which indicator cards have been taken with a car in actual operation on the road.

The apparatus consists essentially of the usual type of low-speed engine indicator attached to an interrupter valve interposed between the engine combustion space and the indicator cylinder. The complete diagram is built up of a number of points, each taken from a separate cycle. This method of obtaining diagrams has been described frequently in articles in *Automotive Indus-*

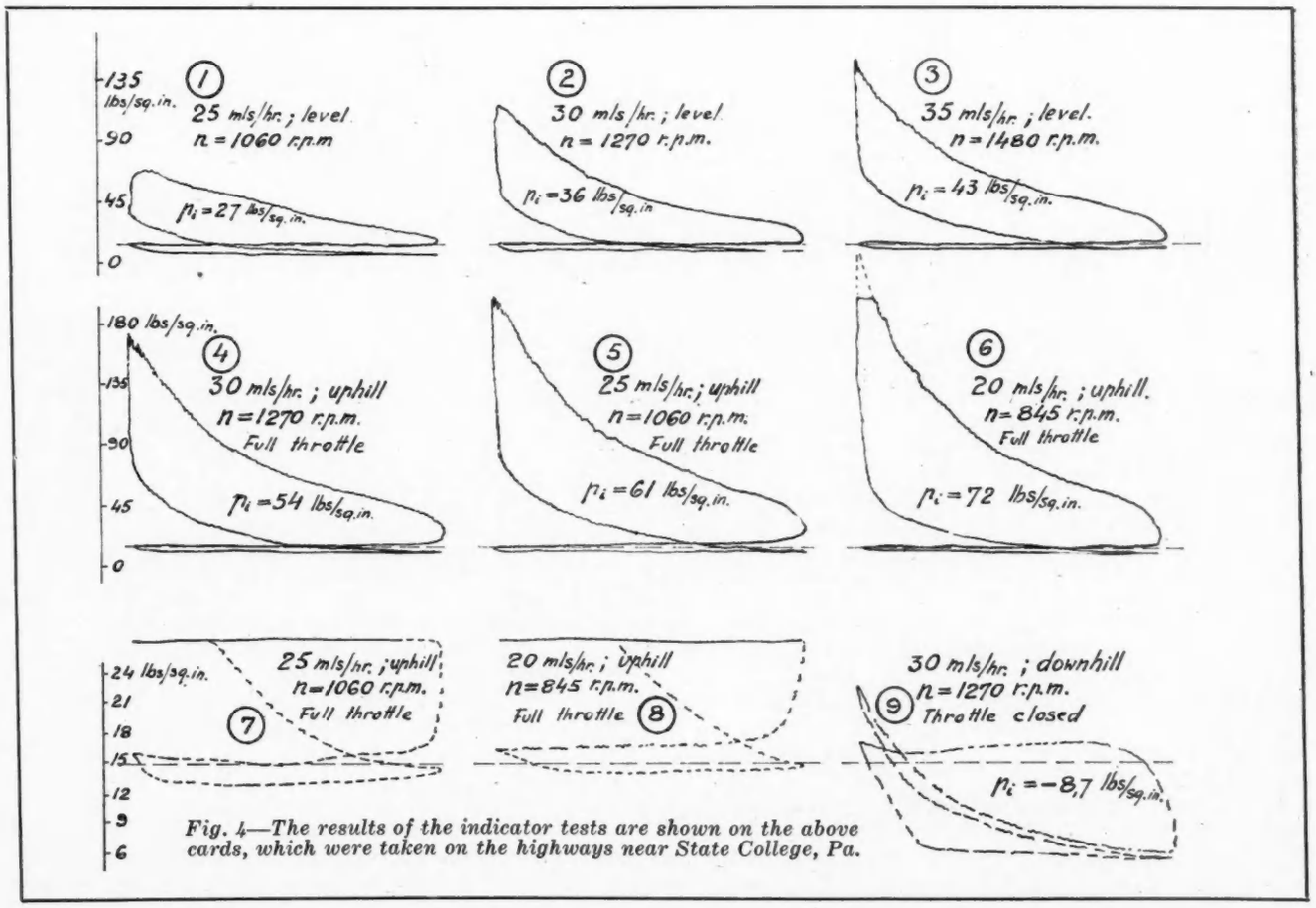


Fig. 4—The results of the indicator tests are shown on the above cards, which were taken on the highways near State College, Pa.

Tests *Recorded* on Car *While* the *Highway*

taking of diagrams under actual
out disturbing the normal
the powerplant.

DE JUHASZ
Research, Pennsylvania State College

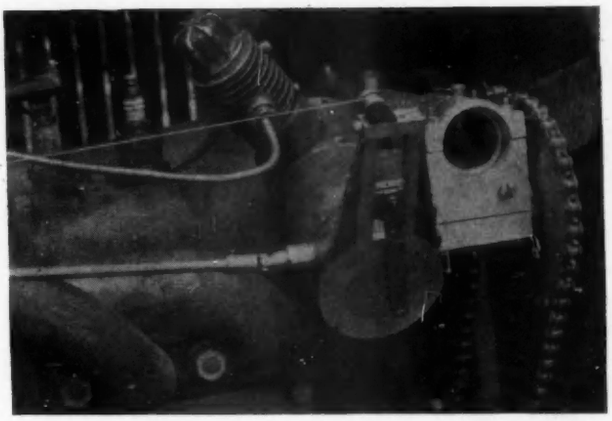


Fig. 3—The indicator mounting, showing how drive is effected

tries and elsewhere. (See *The Automobile Engineer*, of England, May, 1922; "Low Speed Indicator Developed for High Speed Engines," *Automotive Industries*, Feb. 7, 1924; "Some Experimental Studies on Indicator Cards," *Automotive Industries*, Sept. 30, 1926; "A New High Speed Engine Indicator," *Instruments*, April, 1928.)

Figs. 1, 2 and 3 show the interrupter valve assembly mounted on a strong piece of pipe rigidly fixed on the fan bracket of the engine. The drive is effected by sprockets and a chain having a 2 to 1 speed reduction. The driving sprocket is mounted on the crankshaft pulley which drives the generator and fan. A similar drive can easily be built up for most engines, or, if more convenient, the drive can be taken from a camshaft. The connection to the engine cylinder is made by a 3/16 in. inner diameter 5 in. long copper tube through a special spark plug shell. With this arrangement no extra opening on the engine cylinder is needed; a short connection with ample cross-sectional area is obtained and ignition is in no way interfered with.

The indicator proper is mounted on the floorboard inside the car body in front of the right seat. Another tube, ⅛ in. inner diameter and about 3 ft. long, passing through the dashboard, connects the interrupter valve with the indicator cylinder. The cord actuating the indicator drum, and the handcrank for changing the phase under test are led through small holes made in the dashboard for this purpose. Thus a person sitting in the right front seat can conveniently operate the apparatus, change the springs and cards, when desired, and turn the crank for changing the phase, while another person drives the car.

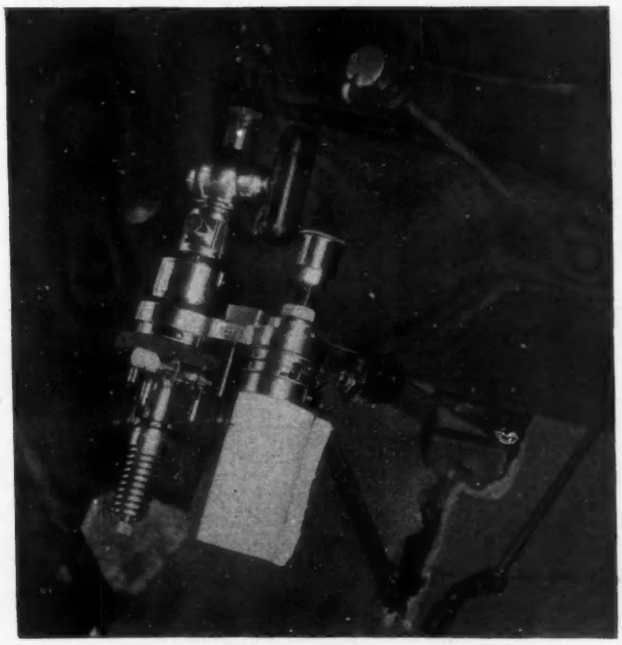


Fig. 2—De Juhasz Indicator attached under the dash of a Model "A" Ford

A series of indicating tests were carried out by the author in the neighborhood of State College, Pa. A number of cards are shown on the accompanying drawing, Fig. 4. Cards 1, 2 and 3 were taken on approximately level roads, at speeds of 25, 30 and 35 m.p.h. Cards 4, 5 and 6 were taken on different gradients of the Nittany mountain. Cards 7 and 8 are weak spring cards, taken with open throttle at different car speeds. Card 9 is also a weak spring diagram, taken with the car going downhill, throttle closed. All cards shown here were taken with the car in high gear. The last named card is of particular interest since it shows the work done by the engine when acting as a brake, and in contrast with cards 7 and 8 is a complete diagram.

Due to the numerous curves and changing gradients where the tests were conducted, it was sometimes difficult to keep both throttle opening and car speed constant during the time required to take a diagram, which is approximately 20 seconds. Aside from this, no difficulty was encountered and the regular operation of the engine was in no way interfered with.

These tests have proved fully that indicating high-speed engines, while the vehicle is in motion, is an entirely practicable method of testing and is convenient to carry out. By fitting the

(Turn to page 124, please)

Indianapolis Rules Will Develop Of *Attracting* Stock

Frederick E. Moskovics

Expensive vehicles with 16-cylinder engines, four-wheel drives and bodies streamlined to the last degree, predicted as leaders of 500-mile contest next year.

By FREDERICK E. MOSKOVICS
as told to
JAMES W. COTTRELL

RULES for the 1930 Indianapolis race instead of fostering modification of stock designs will bring about a development of freak cars, which I believe will cost more, run faster and depart further from stock design than the 91 in. jobs.

No doubt there will be a lot of modified stock cars at Indianapolis next year—hundreds of garagemen would like nothing better than fixing up a stock job for the race for the cheap publicity. But they will be outclassed by a few highly specialized jobs, thoroughly impractical anywhere else, which will be built because of the latitude permitted by the new rules.

It has been said that the new rules will encourage development of vehicles more like stock cars rather than special racing models of the past. But just the opposite probably will happen. The new rules encourage building of special types, even more specialized than the present racing jobs. Instead of limiting entries to real stock cars or reasonably modified stock cars, as in Europe, there is the greatest latitude for designers to build all sorts of freaks. Under these conditions, the man who has the most money to spend will have the best chance to win. If the intent is to improve stock cars by developing features which reasonably may be included in them, I am of the opinion that entries should be restricted to modified stock cars and that combined weight of fuel and oil should be limited to something like ten miles per gallon of gasoline and say 400 miles per gallon of oil.

The rules are such that an entrant can spend—well, let me outline an ideal car for this race in 1930 to show how much he can spend—

Engine, 16 cylinders in two separate banks of eight cylinders; V-type, with separate crankshafts geared together, developing 200 to 250 hp. without blower.

Drive: four-wheel drive taking power from reduction gearing at rear of engine. Moderate reduction in axles permitting location of propeller shafts about 4 in. from ground.

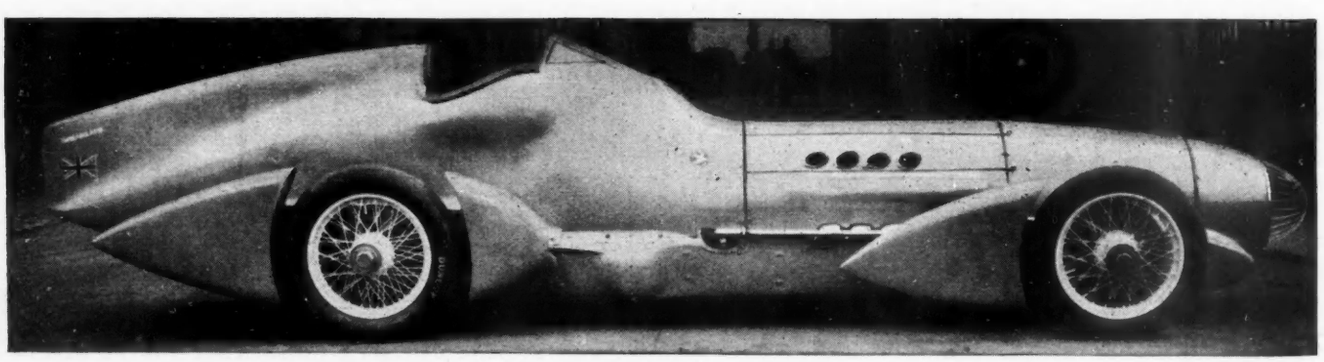
Height, probably lowest ever entered in the race.

Streamlined to last degree.

Such a car will cost more than any car that ever started in Indianapolis. With experimental work and engineering it would cost perhaps $150,000 to produce a team of two cars of this type for the 1930 race.

Is it unlikely that anyone would undertake to build a racing job of this type? Not at all. I am reasonably certain that one of the most prominent drivers in the country already has started to build up just such a car.

Another fault with the 1930 rules is that they check development of worthwhile features, such as superchargers and three and four valves per cylinder. Superchargers are the best development in years. They



Above is pictured Captain Malcolm Campbell's "Bluebird," an example of streamlining which Mr. Moskovics believes will be possible at next year's Indianapolis race, under the contest rules as they stand at present

Freak Racing Cars Instead Models, *Moskovics Says*

hold many possibilities for use in passenger cars. Both three and four valves per cylinder have been used successfully in standard automobiles both here and abroad. Why throw them out? Why restrict so marked a development?

As in the case of horses, racing is supposed to improve the breed. If we are actually trying to improve the breed of cars, why take any steps which will restrict development of ordinary passenger cars? We should foster ideas which may be incorporated in standard automobiles, not hinder them or rule them out.

Putting two men in each car, as contemplated by the 1930 rules, to my mind, is needlessly endangering the lives of the extra men. If it is desired to have cars with space for two men within the body, there is no objection. If we wish to add to the weight the car must carry, it is easy to put in a sand bag or two. But the mechanician is not necessary for the operation of the car on the track, as is shown by the fact that in Europe where two-place cars are raced only one man is carried, in most instances.

Making the race more spectacular is the only one reason I can see for this provision of the new rules. But I can see a real danger to men in some of the hopped-up stock cars—driven by inexperienced drivers—competing against special jobs such as I have described. And, in any event, doubling the number of men on the track doubles the risk. The question is whether we are drawing rules for a Roman holiday or a sporting event.

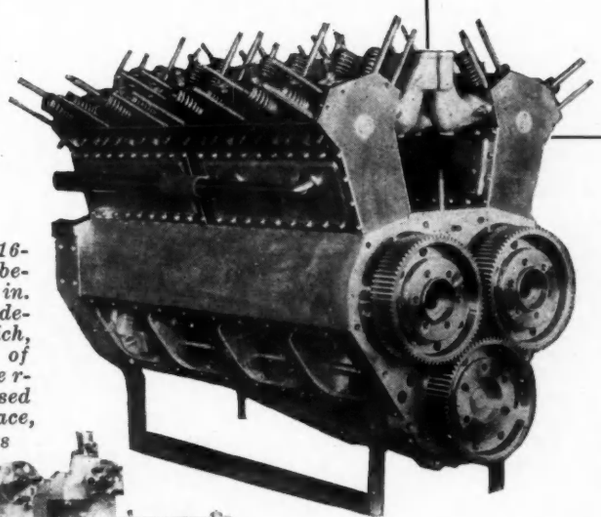
Drivers of speedway cars surely are the men who have the most intimate knowledge of all of the details of racing. Putting aside my thoughts on this subject, for the moment, let us see what the drivers think about the new rules. Every driver present at a meeting held recently at Indianapolis condemned the 1930 rules, not because their 91 in. jobs would be out of Indianapolis next year but because of the situation they foresee in the future.

The complaint of drivers is based upon their belief that the fellow who is the best promoter and gets the best financial backing will have the fastest and best car next year and that the rules open up the way for all sorts of freaks.

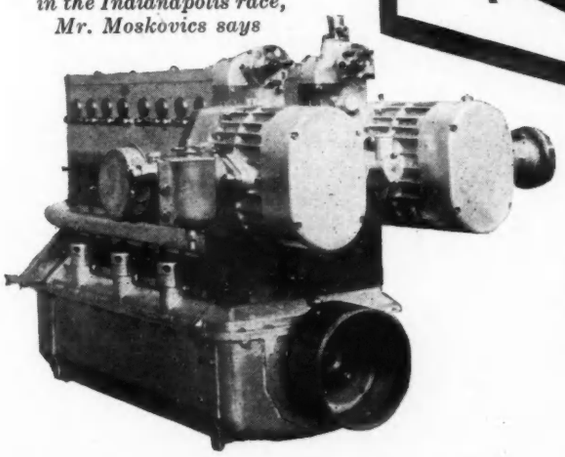
In making this criticism, which I offer in a constructive way, I have no axe to grind, as I am not connected with any manufacturer in an official capacity. On the contrary, I am pointing out what I consider to be dangers in the present rules for next year's race, because I wish, if I can, to help racing, in which I have been interested for many years.

What can be done about it? Why not make it a race for stock or semi-stock cars? Let us limit the fundamentals of the cars to those used by manufacturers in production on January first of the year of the race. Permit changes but keep to the same major units. Place a limit upon fuel as at Le Mans. Handicap superchargers under the handicap established in Europe so that they will be used only when beneficial.

FREDERICK E. MOSKOVICS has taken an active part in automobile contests for the past twenty-five years. Many racing cars were directly or indirectly the result of his activity. His interest in racing continued while he was with Nordyke and Marmon from 1914 to 1924 and with Stutz from 1925 to 1928. While president of Stutz, he organized the stock car racing team which won many championship events in 1927. He was also interested in the sixteen-cylinder special job built by the late Frank Lockhart, for the Daytona Beach record trial in 1928.



View of a Bugatti 16-cylinder engine (below), of 234 cu. in. displacement, and developing 250 hp., which, with the exception of the Roots supercharger, could be used in the Indianapolis race, Mr. Moskovics says



Above is shown a type of engine described by Mr. Moskovics. This powerplant is a Stutz special, with 16 cylinders in two separate banks of eight cylinders, V-type, with separate crankshafts geared together, and capable of developing 200 to 250 hp. without a blower

Racing such cars would give us information of direct value and application to passenger car design. To illustrate, let us require that every car be started by its own electric starter. Every owner is interested in starters. All piping and fittings should be standard throughout. Cutting gas lines and inserting hose to overcome vibration would not be permitted. Neither would taping of lines to prevent breaking be allowed, unless this is standard. Fuel feed should be standard. Ignition and light wiring should be as delivered on stock cars to test these features of stock car design.

Modifications should be permitted to increase speed. Let the entrant set valve and ignition timing any way he wants, change rear axle gearing at will and experiment with springs. The carburetor should be of the same design as that on standard production but could be larger or have different internal specifications. Manifolds also should be of standard pattern, although larger passages could be allowed. Oil coolers should be permitted if desired, because weight of fuel and oil would be limited and stops for fuel would be restricted to one every 150 miles. This would develop large gasoline carrying capacity, a very desirable feature from the owner's standpoint.

Fuel tanks, motor location, cooling and frames should be standard. Tanks on passenger cars should be large enough to carry a car 150 miles with wide-open throttle. Changes in motor location should not be allowed as this affects balance, which should be a part of the fundamental design of a car. Cooling of a stock car, of proper design, should suffice for a race such as that at Indianapolis, so radiators, both size and location, should be standard.

Limitation of fuel and oil weight for a race not only promotes economy but it adds suspense, which increases public interest. If a car is far in the lead, there is always the question whether it has gas enough to finish. There is uncertainty until the first car crosses the finish line and this keeps the crowd on edge until the last car is given the checkered flag.

I have no suggestion as to the amount of fuel and oil to be allowed for a 500-mile race. It should not be so low that it calls for the use of miniature engines. Possibly 10 miles per gallon would be all right, or it might be more or less than this figure. Some limit should be adopted, as has been done abroad. This too would restrict maximum speed to a reasonable point.

Handicapping the supercharger would tend to develop both engines and blowers. Piston displacement would be restricted, as in the new rules, and if a blower is used less piston displacement would be allowed. This would make a designer consider the advantages of blowers against loss in piston displacement under the rules and use blowers only when he is sure of some practical advantage. That is the way we wish to develop superchargers, is it not?

Fuel used in the cars would be any "buyable" fuel regularly sold at gas stations. This provision would automatically limit compression ratio to something of the order of that practicable for use in passenger cars.

Modified stock cars, such as I have sketched, could be produced for a moderate cost, perhaps not more than $5,000. There would be plenty of competition among the 32 starters at Indianapolis under rules of this kind and entries would not be limited to organizations with limitless capital or the wealthy individual.

High-Speed Engine Indicator Tests Recorded

(Continued from page 121)

vehicle with additional measuring instruments, such as a sensitive fuel gage, accurate engine speed counter, spark phase indicator, etc., a car, boat or airplane can be used, so to speak, as a moving laboratory. In the case of a car, the experiments should be preferably conducted in a proving ground, on straight level, or straight roads of constant gradient. In the author's opinion, such tests would be valuable, especially in the design of racing cars, boats and airplanes.

One of the most important problems of motor vehicle design consists in properly coordinating the speed and torque characteristics of the powerplant to the speed and resistance characteristics of the vehicle. On this depends, to a great extent, the speed, acceleration, fuel consumption and other performance characteristics of the vehicle.

According to the purpose of the vehicle (and the word is here used in its broad sense) one or the other factor of performance is given a greater importance. For vehicles intended primarily for high speed, such as racing cars, boats and airplanes, it is of paramount importance to insure that the maximum power output, of which the engine is capable, can be utilized; i. e., that the resistance curve intersects the power output curve at its peak point. In utility vehicles designed primarily for high economy of operation, it is important to design the power transmission mechanism in such a way that the most frequently used load and speed conditions coincide with the minimum specific fuel consumption point of the power curve.

On vehicles using high-speed engines as prime movers, indicating in actual operation is not being used at present, although its desirability is recognized. Approximating methods, such as testing the engine, transmitting elements (gearbox, differential, bearings and wheels in the case of a car; the water propeller of a boat; air propellers of airplanes or airships), and vehicle body (car body, hull, fuselage and wings) separately have been employed. This procedure has yielded valuable results, although the actual operating conditions cannot be, in several respects, simulated in such tests.

There is no doubt that taking indicator diagrams under actual working conditions, without disturbing the function of the engine, would be a helpful compliment of, or even a preferable substitute for, the present-day testing methods.

The author is greatly indebted to E. R. Queer, instructor in engineering research at Pennsylvania State College, for his cooperation in carrying out the tests.

A STATUE has been unveiled to Gustave Eiffel at the base of the Eiffel tower in Paris. Eiffel distinguished himself not only by the erection of this 1000-ft. steel tower for the Paris International Exposition of 1889, but also by his early work in aerodynamics in an aerodynamic laboratory which he installed at the foot of the tower. In the wind tunnel of this laboratory the aero-dynamic values of many forms of airfoil were determined.

Materials Handled Automatically in Chevrolet *Drop Forge Plant*

Newly developed shop is completely conveyorized, disproving the opinion held generally in the industry that such methods could not be used.

By HUGH DEAN
Manager, Chevrolet Drop Forge Plant

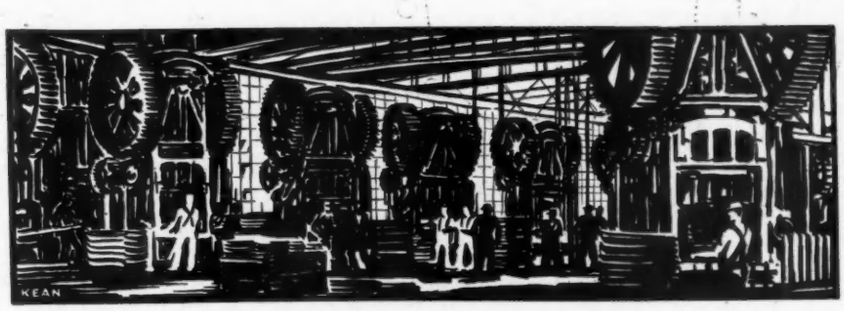
THE Chevrolet Drop Forge Plant works to what is known as a schedule which is made up for several months in advance and is an authorization to purchase material for that period. The material to be purchased is scheduled with sources of supply so that, while maintaining production, inventories can be turned in at least once each week.

The authorization reflects actual production for the month immediately following its issue and tentative figures for the following months. This permits us, at all times, to provide steel mills with an intelligent picture of our requirements and permits them to roll and ship so that all confusion and excessive freight and express charges resulting from last minute placing of orders are eliminated.

During the year 1928, we received and used 202,000 tons of steel consisting of 90 different sizes and 17 specifications from which we forged 101 parts. All steel is ordered in multiple lengths with no allowance made for reshearing. Each specification has its own color scheme and we insist that the mills paint every bar.

Our steel yard contains 194 bins separated by 8-in. H-beams, each bin having a capacity of 100 tons. We have four 10-ton magnet cranes used exclusively in the unloading of steel cars, the loading of flash cars and the moving of steel from bins to the three shear sheds. These shed houses contain seven billet shears and four alligator shears. All steels are cut cold.

When steel is received, it is placed in bins nearest to the shed in which it is to be cut. The foreman in charge works to an unloading card which is made up by a steel record clerk from shipping notices and which includes the car number, the size and the specification of the steel contained. After the steel is unloaded the foreman enters on the card the bin number and sample numbers. From each heat, 12 samples about 1 in. long are cut and sent to the laboratory for physical and chemical tests. Steel is moved from the bins to the shears and then to the different hammers on the authority of hammer cards. These cards are made up by a production clerk and are turned back to him when the job is completed. These cards show the number of pieces to be cut, sizes, specifications, cutting lengths, location of stock and the hammer which is to do the work.



Stock is moved from the bins to the shear tables by magnet cranes and then shoved across rollers to the shears. After cutting, the steel is racked and dispatched to the various hammers by means of electric trucks.

At each hammer, we have an end dump rack and either a box rack or a flat rack. Into the dump rack one member of the hammer crew places the flash. When filled, the dump racks are hauled by electric trucks to the scrap dock and the flash is loaded into cars by magnet cranes.

Wherever possible, the forgings are placed directly into box or flat racks as they come from the hammer, but frequently the piece falls in front of the hammer where it is inspected and counted by inspectors, who then rack the pieces.

From the hammers the forgings are moved to secondary operations such as trimming, grinding, heat treating, rattling and pickling, in racks hauled by electric trucks, with the single exception of the cold trimming operation. Here, press hands place all flashings in the upper tier of a two-tier conveyor and the trimmed forgings in the lower tier. The conveyor empties the forgings into an automatic tumbling barrel, where they are rattled and then emptied onto a conveyor sorting table where they are finally inspected, sorted and prepared for shipment. At the other end of the conveyor, the flashings are emptied into a dump rack which, in turn, is emptied into the scrap dock.

It has been the consensus of opinion that the forging industry in general is not suitable for the installation of conveyors and automatic handling of forgings. This theory we have disproved, and so convincingly that we are pre-

paring a program that will entail the entire revamping of our present shop. Early last year, we started the erection of a plant to be devoted exclusively to the manufacture of crankshafts. We made up our minds to have it as nearly automatic as humanly possible.

We designed automatic furnaces for heating the raw stock; monorails for carrying the crankshafts to the press where they are trimmed, to the upsetter where they are flanged, to the restrike hammer where they are restruck, and, finally, to the heat treat.

When leaving the heat-treating furnaces, the crankshafts are placed on carriers while still hot and are shoved automatically through the quench heat on a two-minute, 20-second cycle. At the discharge end of the quench furnace they are picked off by an unusual arrangement of fingers which lower the crankshafts into the quench bath and then replace them on other carriers on which they are passed through the draw heat.

From here, they are carried by gravity conveyors to straightening presses, where they are straightened and placed in pickling baskets. The crankshafts then pass through the pickling bath and, in the same baskets, are carried to the grinders where each shaft is ground for a Brinell test.

After leaving the grinders, the forgings are placed on slat conveyors which carry them directly into freight cars where they are packed for shipment. During the journey on the slat conveyor, each crankshaft is brinelled, indexed and inspected.

In addition to handling the forgings automatically, all flash and tong ends are also handled in this manner. Monorail conveyors are provided with hangers on which hammer crews place scrap parts. The conveyors then carry the scrap to the yard, where automatic tripping devices dump the hanger loads according to the type of material being carried on it.

Flanigan Internal Two-Shoe Brake

THE accompanying drawing shows the latest design of brake evolved by E. B. Flanigan, Inc., of Wilkes-Barre, Pa. It is an internal two-shoe brake and differs from the conventional design in that the shoes, instead of being pivoted on one or two anchor pins, are connected to such a pin by a linkage, and also in that the form of expander cam is unusual.

When the brake is applied by a rotary motion of the cam, the primary shoe, that is, the one over whose frictional curve the drum moves from the toe to the heel, is forced around in the direction toward the anchor stud. With the ordinary construction the whole of the circumferential force on the shoe is taken by the stud, but in this case about one-half of it is transmitted through the linkage from the heel of the primary to the heel of the secondary shoe. In the conventional internal shoe brake the heel end of the secondary shoe presses against the anchor stud, which reacts on it, but in this case, evidently, there is a positive pressure on the heel of the secondary shoe, which is transmitted to it from the heel of the primary shoe by the linkage connecting the two shoes. The drag on the secondary shoe increases from the heel to the toe, owing to the friction between it and the drum, hence there is a very considerable pressure of the toe of the secondary shoe on the cam, a greater pressure than that of the cam on the primary shoe. This inequality of the reactions between the cam and the two pressure plates, respectively, is taken account of by making the cam unsymmetrical. That portion of the cam contacting with the secondary shoe has a smaller "throw" than the portion contacting with the primary shoe. The cam is not floated, but is rigidly supported.

The result of floating the heel ends of the brake shoes in the manner described is said to be to equalize the wear between the two shoes. With the conventional two-shoe internal brake, the wear is always greater on the shoe which is forced against the anchor stud by the drum friction, and in self-energizing brakes, in which one shoe is hinge-jointed, or articulated, to another, the wear is least on the floating shoe and greatest on the anchored one. The obvious advantage of equalization of lining wear is that it results in economical use of lining.

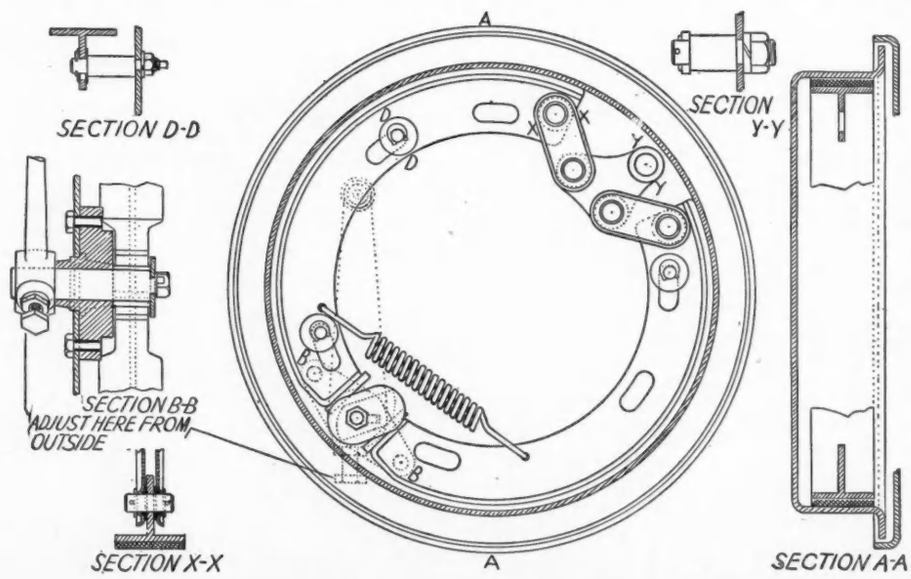


Diagram drawing of Flanigan "equi-servo" brake

The following advantages are claimed for this brake: Owing to the wrapping action, the pedal pressure required is small, besides which the brake action is always directly proportional to the pedal pressure. Permanent equalization is accomplished, that is, equalization between the two shoes of each brake. The surface of the lining in contact is large, and brake lining is used economically. There is no grabbing and no localization of pressure. The shoes occupy the same position for both forward and reverse motion. Braking action is not affected by wear of linings. The brake has a simple external adjustment.

Actual *Thickness* of Case *Measured* By *Differential* Method

System developed in England whereby it is possible to determine the case-depth of hardened steel parts without sectioning or breaking through the case.

UP to now it has been impossible to determine the thickness of case on case-hardened parts without sectioning the part or breaking through the case. The instrument usually employed for hardness tests is the Brinell, and the reason this does not permit of determining the thickness of case is that its readings are influenced by three factors, namely, the hardness of the case, the thickness of the case, and the hardness of the core metal. A differential method has now been developed by Edward G. Herbert and Paul Whitaker of Manchester, England, whereby two separate measurements are made, one depending upon the true hardness of the case and the other upon both the hardness and the thickness of the case, so that by taking the difference of the two readings and referring to a table, the actual thickness of case can be determined. It is proposed to apply the new method also in connection with the Krupp nitriding process and with chromium plating. Messrs. Herbert and Whitaker described their method in a paper presented before the Iron and Steel Institute at its recent meeting.

The time test made with the Herbert pendulum hardness tester measures the surface hardness, and is unaffected by hardness below the surface. This arises from the fact that the 1-mm. steel ball used in the pendulum makes no permanent indentation in very hard steel, the time of swing by which the hardness is measured being a function of the radius of curvature of the elastic depression caused by the pressure of the ball,

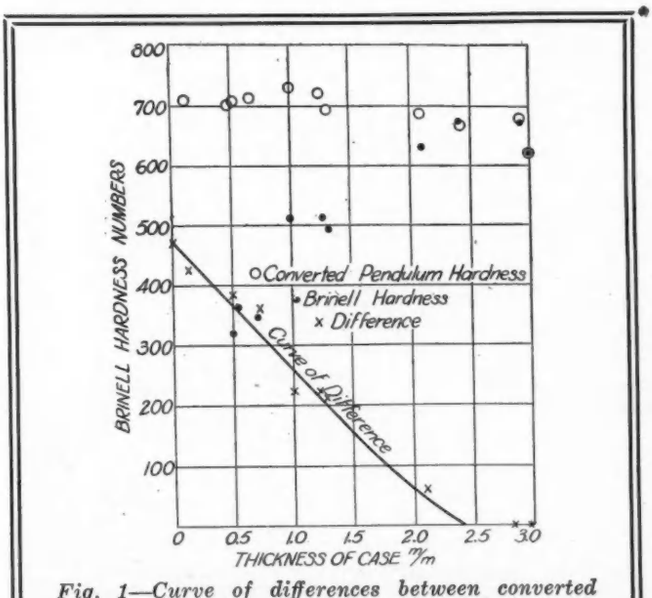


Fig. 1—Curve of differences between converted pendulum hardness and Brinell hardness with a 10-mm. ball and a 3000-kg. load

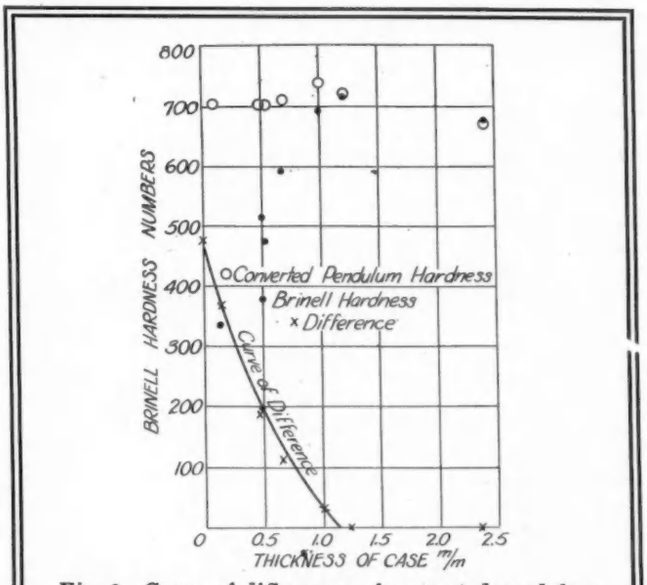


Fig. 2—Curve of differences of converted pendulum hardness and Brinell hardness with a 5-mm. ball and a 750-kg. load

and in which the ball rolls. It is thus possible to measure hardness gradients by steps of 0.0005 in. or less by honing away the surface and making successive hardness tests.

Tests show that true hardness readings are obtained with the pendulum on hard steel plates of any thickness down to 0.1 mm. (0.004 in.), when the plates are supported on soft mild steel, and true readings would be obtained on even thinner hard layers if integral with the soft core, as in case-hardened steel. In testing commercially case-hardened steel it may, therefore, be taken as strictly accurate that the pendulum reading is unaffected by the thickness of the case.

The Brinell hardness number of a case-hardened specimen depends on the hardness and thickness of the case, and, especially if the case is very thin, on the hardness of the core. The effect of the Brinell test (10-mm. ball, 3000-kg. load) on a steel having a case 0.5 mm. thick, is such that the case is pressed into the core, but it offers considerable resistance to penetration, the resulting hardness number being higher than

that of the core by an amount which is nearly proportional to the thickness of the case. Annular cracks are usually found in the impression, but they do not seriously interfere with the measurement of its diameter.

In the case of a Brinell impression in steel which had been case-hardened to a depth of 1.3 mm., the case is pressed into the core to a slight degree and the surface is unbroken, but a conical fissure is created below the impression, and this opens when the load is removed, owing to the elastic recovery of the hard surface. A Brinell test on a still thicker case does not crack it, but the surface of the specimen is seen to be slightly concave around the impression, showing that there has been some yielding of the core, and the hardness number is lower than it would have been if the steel had been hard throughout.

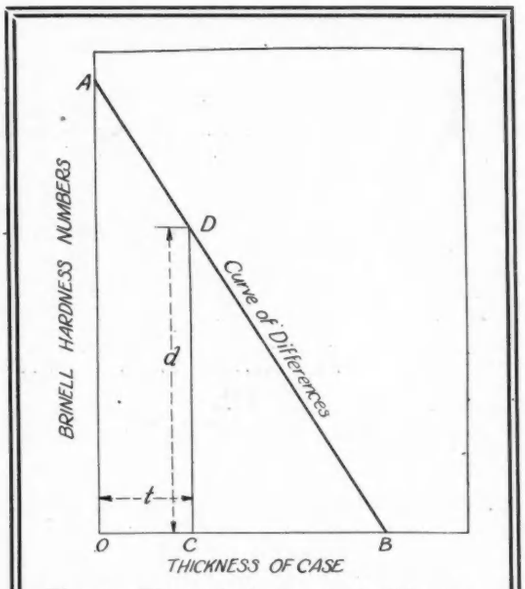


Fig. 3—Theoretical curve of differences

A specimen with an infinitely thin case of hardness 700 Brinell would obviously give a Brinell reading equal to that of the core, 228, since an infinitely thin case would not affect the Brinell test. Thus the point where the curves of differences in Figs. 1 and 2 cut the axis of ordinates is 700 — 228 = 472. Starting from this point, the curve of differences is seen to be nearly a straight line, cutting the horizontal axis at a point corresponding to the minimum thickness of case for zero difference between the two hardness readings. This thickness is 2.4 mm. when the Brinell test is made with a 10-mm. ball and 3000-kg. load, and 1.15 mm. with a 5-mm. ball and 750-kg. load. On thicker cases the respective Brinell tests gave the true hardness, and the difference between the converted pendulum and the Brinell readings was zero.

Thus the differential gives a clear and consistent indication of the thickness of the case. The secondary test with a 5-mm. ball is only capable of measuring case thicknesses up to 1.15 mm., but a zero differential indicates a case of not less than 1.15 mm., which would be sufficient for most commercial work. The 5-mm. ball Brinell test will often be preferred, because the impression is small and does not seriously deface the work, while the range of thicknesses it is capable of measuring covers general commercial practice. The 10-mm. ball with 3000-kg. load can be used to measure thicker cases up to 2.4 mm., and still thicker cases can be measured by using a heavier load.

A general expression for the differential method of case measurement applicable to steels which have different core hardness can be found by assuming a straight line for the differential curve. In Fig. 3, let OA be the average difference between the true Brinell hardness of the case and of the core, OB the minimum case thickness for zero differential, and D any point on the differential curve corresponding to a case thickness OC.

Let C be the converted pendulum hardness of case $= 10T$ or $13.5D$; C, the Brinell hardness of the core; M, the minimum case thickness for zero differential; t, the thickness of case corresponding to any point D, and d, the corresponding differential value.

In similar triangles AOB, DCB,

$$\frac{OA}{OB} = \frac{CD}{CB}$$

$$\frac{C-c}{M} = \frac{d}{M-t}$$

$$M - t = \frac{Md}{C-c}$$

Thickness of case =

$$t = M\left(1 - \frac{d}{C-c}\right)$$

It will be observed that this expression takes account of all three variables, case hardness, case thickness and core hardness, and that it contains only one constant—M—which depends on the conditions of the Brinell test, and on the core hardness of the particular steel employed. The value of M for any given steel can be found by experiment. It is only necessary to make differential tests on cases of known thickness and solve the equation for M, taking $C - c$ as the average difference between case and core hardnesses in the correctly case-hardened steel.

Efficiency of Diesel Engines

A RESEARCH paper on the indicated efficiency of Diesel engines with airless injection (Der Indizierte Wirkungsgrad der Kompressorlosen Dieselmaschine) by Dr. Eng. Fritz Schmidt, has been published by the VDI Verlag, Berlin. As a rule, the indicated efficiency of the Diesel engine is calculated with the aid of a standard or ideal process based on constant specific heats. If the variability of specific heats and the change in the composition of the gases are taken into account, the calculation becomes complicated and tedious and the object of Dr. Schmidt's investigation was to make possible a simple and accurate determination. The indicated efficiency for the ideal process was calculated for the whole range of air surpluses, compression pressures, and maximum pressures that occur in practice. Influence on the indicated efficiency of changes in the initial temperature and in the heat value, as well as of dead gases remaining in the cylinder and of the fuel composition, were determined. A method is developed in the paper which permits of determining the indicated efficiency in a simple manner for any particular case, with the aid of tables and diagrams. It was found that the indicated efficiency varies little with the load factor, and ranges between 5 and 85 per cent.

Studebaker Announces Bus *Chassis* For *Parlor-Car* Type Body

Vehicle is powered by an eight-cylinder vertical engine and has four speeds forward and one reverse. Designed primarily for intercity operation.

A BUS chassis with 220-in. wheelbase, 118-hp. eight-cylinder engine and designed to accommodate a 25-passenger parlor-car-type body has been announced by the Studebaker Corp. of America. The maximum weight allowance for chassis, body and load is 15,070 lb., the weight of the chassis being 6200 lb.

The engine is the Studebaker eight-cylinder vertical, with 3½ in. bore and 4⅜ in. stroke, giving a piston displacement of 337 cu. in. The compression ratio is 5.15 to 1 and the maximum torque is said to be reached at 2000 r.p.m. Four-point mounting is used. The carburetor is supplied with fuel from a 30-gal. tank at the rear of the frame through a mechanically-driven pump. The carburetor is of the duplex type and the usual 12-volt bus lighting system is used.

The clutch is of the double-disk, dry type, 11 in. in diameter. The transmission, which is built together with the engine, affords four forward speeds and one reverse. Standard ratios are 4.8 in first, 3.0 in second, 2.0 in third, direct in high and 6.5 in reverse. Provision is made for an S.A.E. standard power take-off or pump mounting.

The three-part driveshaft is supported at the middle by two self-aligning, double-row ball bearings. All sections are tubular and of sufficient diameter to withstand all torque and whipping stresses. A slip joint at the rear allows for axle motion. Under full load the drive is practically in a straight line.

The front axle is drop-forged and of the reverse Elliott type. The rear axle is semi-floating and has chrome-molybdenum driveshafts and a malleable iron housing.

The service brake is of the internal, mechanical, self-energizing four-wheel type, with 17¼ by 3-in. drums. Pedal pressure required is reduced two-thirds by a Westinghouse vacuum booster. The total braking area is 535 sq. in. The parking brake is of the disk type, 14 in. in diameter, and acts on the driveshaft.

All chassis springs are of Studebaker manufacture. The front springs are 38 by 2½ in., with fourteen leaves; the rear springs 56⅜ by 3 in., with fourteen leaves. The front wheel tread is 63 in.; the rear-wheel tread—measured midway between the dual tires—64 in. The frame side rails are 8⅛ by 3 11/16 by ¼ in. There are three tubular and five pressed steel cross-members.

The cam-and-lever type of steering gear having a reduction of 18 to 1 is used. Three full turns of the steering wheel are necessary to cramp the wheel from full right to full left position. The turning radius of the bus is 35 ft. Tires are 34 by 7, 12-ply all around, with duals at the rear. Balloon tires 36 by 8.25 for use with Van malleable iron wheels are optional at no additional cost.

The wheels are Van malleable iron, with eight

(Continued on page 133)

Studebaker 25-passenger parlor-car bus with 220-in. wheelbase

General Motors Research Laboratories For Years Ahead *of Production*

While about 40 per cent of the work is scientific investigation, their main function is to act as consulting assistants to the manufacturing divisions.

THREE moves since 1920 is the record of the General Motors Research Laboratories. The recent move, from the General Motors Building in Detroit across the street to the new 11-story Research Building, was made necessary by the growing activities in fundamental research.

In General Motors, the Research Laboratories as now constituted, supplement the work of the engineering departments of the manufacturing divisions. They are not, therefore, purely experimental engineering laboratories, but act principally as consulting assistants to the divisions. About 40 per cent of the work is pure science research—gathering fundamental information for the betterment of General Motors' products.

Located as they are now at the very center of the automotive industry, they are not yet bothered by problems of production and so can look into the future and plan improvements years ahead.

To obtain a picture of the varied activities of the Laboratories, it would be well to give an outline of its present organization. Its activities are directed by the Technical Committee of General Motors, which is made up of the chief engineers of the divisions, the General Director of the Laboratories, the head of the Patent Section, and several vice-presidents of the corporation.

The Laboratories themselves are divided into sections, each with a section head directly responsible to the General Director, Technical Director and Business Director. The names of the Sections and their work is as follows:

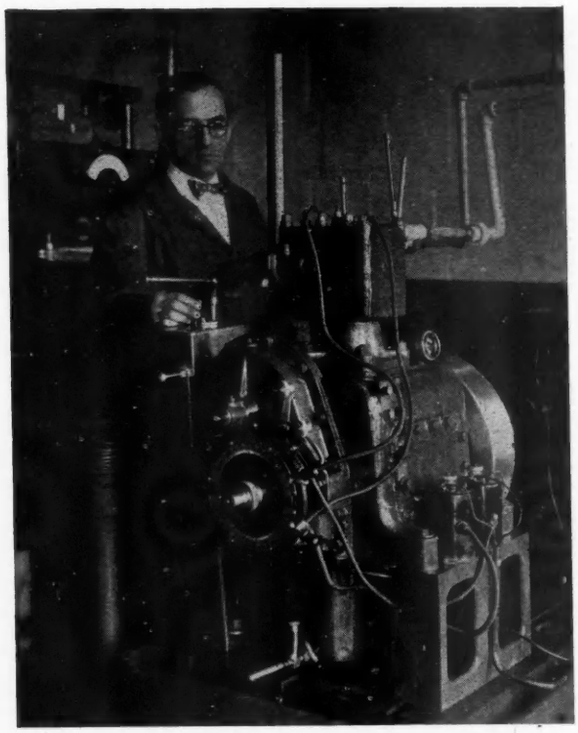


Fig. 1—View of the balanced single-cylinder high-speed engine used by the General Motors Research Laboratories for making studies of combustion chambers and spark plug location

The Power Plant Section has the problems of engine design and investigation of new engine types and component parts. It also supplies mechanical engineering services to other sections of the Laboratories.

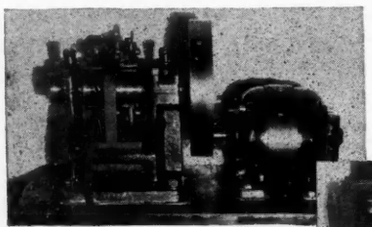


Fig. 3 (above)—View of synchronous motor-driven master timer

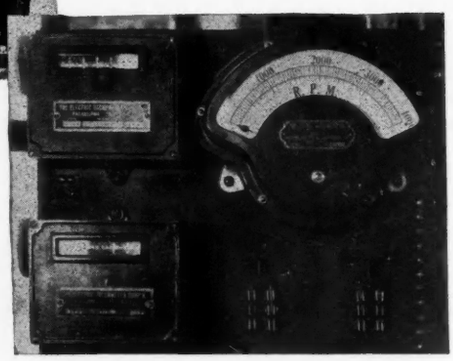


Fig. 2—At the right is shown the timing panels, with electric tachometer and time recorder used in conjunction with dynamometers in the General Motors Laboratories

The Special Problems Section handles problems of engine balance, balancing machines and torsional vibration studies.

The Engineering Tests Section conducts road tests, chassis dynamometer tests and cold room tests, and is concerned with improving riding qualities and other chassis problems.

The Dynamics Section is engaged in the investigation of engine fundamentals, thermodynamics and power transmission.

The Fuel Section studies problems pertaining to combustion and fuels.

The Chemical Research Section takes care of problems on paints, finishes, lubricants, plating, physical tests and material control.

The Metallurgical Section assists the divisions on problems related to metals and alloys found in automobiles.

The Electrical Section develops instru-

Plan Improvements

ments and conducts fundamental research on electrical devices.

The Carburetor Department studies problems of distribution, carburetion and manifolding.

The Lighting Section is concerned with road illumination, stop and tail lights and the development of better headlighting.

Besides these sections there are several service sections which aid in conducting a research organization. These include the Technical Data Section, Accounting Section, the Machine and Pattern Shops, and the foundry.

To carry on this work the new Research Laboratories have been equipped with much new and improved equipment. Some of the interesting features of this equipment are illustrated herewith.

A new balanced single-cylinder high-speed engine for making fundamental studies of combustion chambers and spark plug location is shown in Fig. 1. To obtain balance, two dummy pistons and connecting rods run opposed to the main piston assembly. A surge tank built into the dynamometer base and the tank surrounding the carburetor insures accurate measurement of the intake air supply. A neon tube type spark protractor gives accurate readings of spark timing without introducing a second gap in the spark plug circuit.

Fig. 6—By means of variations in current of the recording instrument attached to the apparatus pictured above, the defects in the materials under test are revealed

All dynamometers have automatic timing devices which record one-hundredth of a minute. These are all operated by impulses from a central synchronous motor-driven interrupter. Fig. 2 shows the timing panels, with an electric tachometer, revolution counter and time recorder. Fig. 3 is a view of the synchronous motor-driven master timer.

Research on the fatigue strength of spiral bevel gear teeth is made on the rear axle test machines, shown in Fig. 4. The axles are driven by an electric dynamometer through a gearbox and the power absorbed by water brakes. To obtain the advantage of high capacity, small size water brakes, the speed is increased between the axle and the brake by worm gearing.

The examination of materials is carried out by several methods, two of the latest being X-rays and magnetic inspection. The X-ray and cathode ray apparatus, shown in Fig. 5, allows the examination of materials for flaws and defects and also the inspection of its crystalline structure. Magnetic inspection is a rapid, simple method of determining hardness, heat treatment and location of flaws. By means of two exploring coils, located on the pole tips of the electro-magnets, shown in Fig. 6, the flux density in the piece under test is measured, any variation showing up as a change in current on the recording instrument.

A sound-measuring instrument consisting of a mi-

Fig. 5—Above is a view of X-ray and cathode ray apparatus for examination of materials for flaws and defects

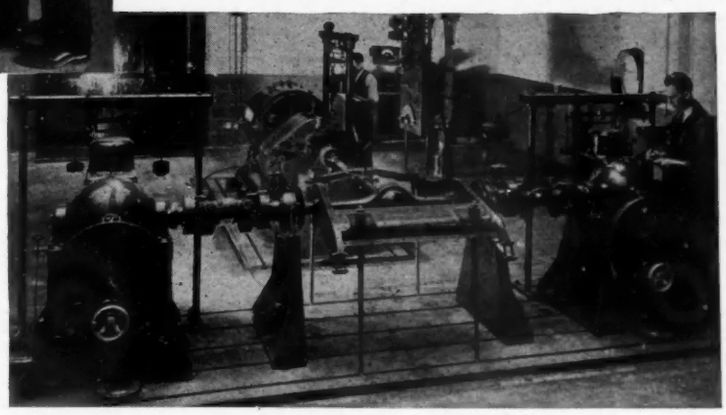


Fig. 4—Rear axle test machines used for research on fatigue strength of spiral bevel gear teeth in the laboratories are shown at the right. The axles are driven by an electric dynamometer through a gearbox and the power absorbed by water brakes

crophone pickup, a distortion-free amplifier and a microammeter for recording sound intensity is used in the studies of gear noises. This instrument is shown in operation in Fig. 7.

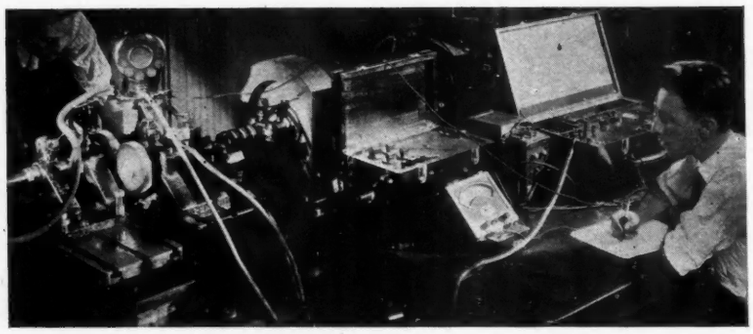


Fig. 7—By use of high quality vacuum tube amplifiers, General Motors engineers record the noise produced by a pair of gears. The sound-measuring instrument pictured above is used in the study of these noises

Air flow studies are important in designing fans, blowers and radiator sections. A wind tunnel is used in these studies. There is a bell entrance and anemometer, which, by means of calibration curves, gives quantitative measurement of the air flow through a radiator section or a fan. Scale model tests of automobiles to determine the influence of streamlining if desired could also be carried out in this tunnel with the addition of some equipment.

If the results of research are to be applicable to the solution of production problems, research often must be carried on using tons of materials instead of ounces and pounds. This has been found true in foundry work. To carry on the investigation on the effect of the quality of pig iron and coke on cast iron, a cupola is operated and tons of metal cast every day.

Trends in 1930 Design

(*Continued from page 116*)

this year, but aside from the multiplication in openings little else has been done to improve ventilation—or heating for that matter.

Probably the greatest improvement in appearance noted universally this year is in the wheels. The new elliptical spokes, shorter than formerly, of the artillery wheels, with the larger hubs and caps, are decidedly more pleasing and more in keeping with the appearance of sturdiness which most manufacturers are trying to convey in their body construction. Demountable wheels have increased in popularity, accompanied by a more profuse equipping of cars with fender wells and trunk racks.

Tandem windshield wipers are most noticeable in the body equipment developments, although individual features, such as the combination clocks and rear-view mirrors on the Marquette, are in evidence here and will be found in larger numbers on the new cars.

No discussion of design trends would be complete, however, without mention of the new front drive cars, with two already announced, one of which is in production. While it is not likely that there will be others within the next six months, practically every automobile manufacturer is investigating their possibilities, and is watching this development with great interest. Moreover, one of the large parts companies has already taken out licenses, it is understood, to manufacture parts for front-drive cars, a further indication that this type of design will probably not be confined to one or two manufacturers.

The new front-drive cars themselves represent no radical departure from existing manufacturing practices. Except for the front axle driveshafts and their universal joints, the units do not differ widely from those found in rear drive automobiles. While this condition may eventually change, the mere fact that such a design can be efficiently worked out is sufficient reason to answer much of the "production problem" argument used against the more general adoption of the front-drive principle. It simplifies considerably the transition period from a rear drive to a front-drive car.

Perspective view of the Automotive Building, Canadian National Exhibition, to be held in Toronto, Aug. 23 to Sept. 7. After the Exhibition, it will be used annually for the fall motor show and the National Motor Show of Canada in the winter. The building will be erected at a cost of $1,000,229 and will be of stone, steel and brick with concrete flooring on the main and mezzanine floors. The ground floor will have 95,000 sq. ft. of display space and 25,000 sq. ft. on the mezzanine

Stewart Offers Two Truck Models With Four-Speed *Transmissions*

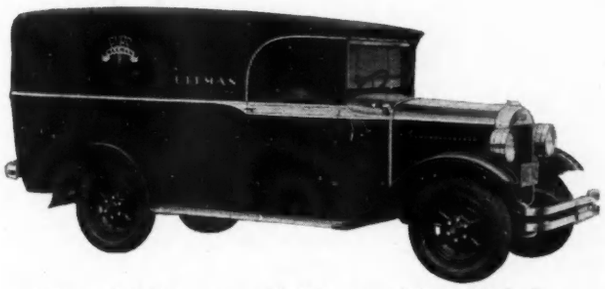
Two heavier chassis sell for $1,495 and $1,695, f.o.b., while the de luxe panel body, with three-quarter and one ton capacity, costs $780 and $800.

TWO new truck models of 1½ and 2 tons capacity and a custom de luxe panel body for its ¾ to 1¼-ton models are announced by the Stewart Motor Corp. of Buffalo, N. Y.

Both of the new truck models, carry Lycoming six-cylinder 3¼ by 4½-in. engines, Fuller clutches and four-speed transmissions, and Clark axles. The rear axle of the 1½-ton chassis is a bevel semi-floating model and that of the 2-tonner a bevel gear full-floating. Bendix two-shoe internal four-wheel brakes are used on both models and they are actuated by flexible cables at the four wheels. Only one brake cross-shaft is incorporated in the assembly.

A heavy channel section cross-member is placed in the frame about midway between transmission and rear axle, where it supports the propeller shaft center bearing. The channel has the open side downward and is gusseted at the point of attachment to the side rails. Radius rods and semi-elliptic helper springs are standard on both models.

The 1½-ton chassis has a standard wheelbase of 136 in., weighs 3680 lb. and sells at $1,495. The 2-ton



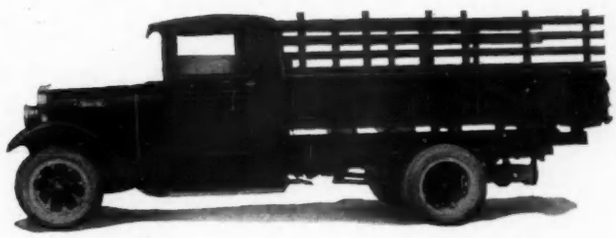
Stewart light commercial type vehicle with de luxe panel body

chassis has a standard wheelbase of 145, weighs 4188 lb. and sells at $1,695. Driving wheels are 32 by 6 in. on the 1½-ton and 32 by 6 or 34 by 7 in. on the 2-ton model, the standard reduction ratios being 6.37 to 1 for both.

The body for the smaller vehicles was designed by Stewart engineers for retail establishments desiring a vehicle of distinctive appearance and one having advertising value. It has a curved roof and curved sides, doors with rounded upper corners, an integral cowl, and panels brought down to the running board.

The frame is of oak and ash and all outside parts of the body are covered with aluminum. The interior is sealed and is fitted with two dome lights. The driver's seat is fixed, while the auxiliary seat adjacent to the driver's seat is removable and is fitted with a lazy-back.

Two sizes of the body are offered, one with 7 ft. loading space for the ¾-ton model, and another with 8 ft. loading space for the 1 and 1¼-ton chassis. The larger body is 52 in. wide and 52 in. high, and has a 46-in.



Stewart 1½-ton truck with farm-type body

inside width between wheelhouses. There are two rear doors, 22 in. wide by 48 in. high. Standard equipment includes saddle lamps, rear view mirror and windshield. Bumpers and rear bumperettes are supplied at extra cost. The price "in lead" is $800 for the 8-ft. body and $780 for the shorter body.

Studebaker Parlor-Car Bus

(Continued from page 129)

spokes and demountable rims. Dual wheels are in the rear. Budd ventilated-type disk wheels are optional at a slight additional charge.

Being intended primarily for intercity operation. the body has been designed with a view to the utmost passenger comfort. The cross seats are placed on 33¼-in. centers. They have double cushions with spring padded backs and spring padded headrests. The backs of the seats are recessed to give more knee room. Seats are arranged in pairs—ten on either side of a 14-in. aisle, with a wide seat for five persons extending across the rear.

The inside luggage rack is large enough to handle all the hand luggage normally carried by the full complement of passengers. The headroom over the aisle in the baggage rack section is 74 in., which permits easy access to the rear seat section.

Windows are of the raised-sash type, opening to a height of 11 in. A rear awning covers the corner windows and extends across the back. Ventilation is by means of side and top cowl ventilators and heating is taken care of by a Kysor unit.

The driver's seat, which is of the bucket-type, without arms and with 17-in. cushions, is adjustable both horizontally and vertically.

First with the News

Reliable, Accurate

News of the Industry

PAGE 134 VOLUME 61 *Philadelphia, Saturday, July 27, 1929* NUMBER 4

Unusual Seasonal Demand Supports Production Pace

PHILADELPHIA, July 27—The automobile industry is rounding out the fourth week of July with production continuing at a rate well above that of the corresponding periods of previous years. With favorable sales prospects in the field, a number of companies preparing to introduce new models are maintaining comparatively high production schedules. Indications are that there will be a greater number of new models introduced in the last six months of 1929 than in any previous half-year. Sales executives of the leading companies report that the exceptional demand for cars continues generally throughout the country.

With the total production for the United States and Canada during the first half of this year announced as 3,411,451 units by the Department of Commerce, as published by *Automotive Industries* last week, it follows that the production of only 1,788,549 vehicles during the last six months of this year will be necessary to assure the total of 5,200,000 units estimated as the total for the year by Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

This means that the industry in the last half of this year may produce 537,960 units less than the total of 2,326,509 for the corresponding period last year and still reach the total of 5,200,000. It seems doubtful at this time that production will be curtailed to that extent within the next five months.

DuPont Income Report Includes G.M. Holdings

NEW YORK, July 26—Income from operations and investments of E. I. du Pont de Nemours & Co. for the second quarter of the year is reported as $16,296,567, of which $7,484,000 is the return from investments in the General Motors Corp. The income figures compare with $11,162,564 for the first quarter of the year.

Total income for the half year ending June 30 is announced as $41,536,412, which compares with $32,696,782 for the corresponding period of 1928.

To Establish Branches

KANSAS CITY, July 22—The American Eagle Aircraft Corp., makers of the American Eagle planes, is establishing a chain of factory branches throughout the United States, according to E. E. Porterfield, Jr., president of the company.

Pierce-Arrow Gains

NEW YORK, July 24—Pierce-Arrow Motor Car Co. and subsidiaries report net profit for the three months ended June 30, of $1,288,643, after all charges. This is equivalent after preferred dividends to $5.93 a share on outstanding no par shares of Class A stock, and compares with net loss of $282,456 for the corresponding quarter of 1928. The profits for the first six months of the current year were $1,737,175, or the equivalent of $7.61 a share.

Johnson Goes to Europe

NEW YORK, July 25—Courtney Johnson, general sales manager and a director of the Hudson Motor Car Co., sailed recently on the Berengaria for an extended tour of the European continent. He will visit London, Berlin, and Brussels, where Hudson plants are now working at capacity, and his itinerary will include the more important distribution points on the continent.

Clark Issuing Stock

NEW YORK, July 24—The Clark Equipment Co. is floating an issue of 40,000 shares of additional stock at $57 a share for use in connection with new business on the books and under negotiation. The proceeds from this issue will be added to those from a recent issue of 10,000 shares taken up by present stockholders and employees.

Fairmont Adding Furnace

FAIRMONT, W. VA., July 22—The Fairmont Mfg. Co., producer of aluminum sheet and castings, is installing an electric heat-treating furnace.

Color Trend Shows Blue in Top Place

NEW YORK, July 25—Advancement of the blue trend in automotive body coloring and recuperation of green at the expense of black, maroon, and brown, are the highlights of the Automobile Color Index issued by the Duco Color Advisory Service of E. I. du Pont de Nemours & Co. Blue has an index of 299 for the month of June, followed by gray with 92; brown, 92; green, 85; black, 75, and maroon and beige, 31 and 14 respectively. Green, says the report, has been subject to more change than any other member of the color family in the past seventeen months, attaining an index position of 350 in March, 1928, and declining to 53 in May, 1929.

Yellow Truck and Coach Reports Profits and Sales

PONTIAC, MICH., July 25—Net profit of the Yellow Truck & Coach Mfg. Co., for the six months ended June 30, before provision for depreciation, was $1,446,156, and after provision for depreciation, $859,659, according to the financial statement of the company issued today.

Net sales of the company for the same period were $28,671,459, the report says. The profit figures include profits of the Yellow Mfg. Acceptance Corp., which account, before depreciation, for $238,792, and after depreciation, for $236,102, of the total.

To Use Kinner Engine

NEW YORK, July 24—American Aeronautical Corp. has announced that the American Savoia Marchetti S-56 plane, which is to be manufactured in its plant at Port Washington, Long Island, will be equipped with a 95-hp. Kinner engine. Their larger types of planes will be equipped with 500 hp. Isotta-Fraschini motors—the 7-passenger S-62 will have one of these motors and the 14-pasenger S-55 will have two of them mounted in tandem.

Brandt Describes Soviet Activities

Engineer Says Russians Plan to Produce Ford Car Themselves

DETROIT, July 24—A. J. Brandt, consulting engineer, who has been doing special work for the Russian government preparatory to the establishment of large automobile factories in that country, upon his return to Detroit indicated that Soviet Russia is planning to make Moscow the automobile capital of Europe.

Mr. Brandt, who spent six weeks in Moscow in consultation with government officials, stated that the Soviet Union contemplates building 311,000 automobiles and trucks, and 25,000 motorcycles during the next five years. He also stated that the Soviet Union intends to offer every inducement to American automobile parts and accessories manufacturers to dispose of their products in Russia.

According to a report he has just received from Russia, V. V. Osinsky, a member of the Gosplan of the Soviet Union, has proposed a 50 per cent tax reduction on combustibles and lubricating materials with an additional 25 per cent reduction within a year. It is also planned to lower, by at least 50 per cent, all duties on imported cars, and to eliminate duties on all spare parts and accessories for automobiles, trucks and motorcycles.

Automobile factories in Moscow, Mr. Brandt said, are modern in every respect, although they show lack of proper management. He stated, however, that the Soviet plans not only to develop its automobile industries but all others as well along the American pattern.

While he refused to state specifically the nature of Henry Ford's contract with the Soviet Union for the production of Ford cars, Mr. Brandt inferred that Ford had sold outright plans and specifications of his car and had made a contract to sell parts to the Soviets. The Soviet government will undertake the production of the Ford itself, Mr. Brandt intimated.

Polish Market Problems Described in Report

WASHINGTON, July 25—The building of Polish bodies onto imported chassis is a matter of increasing concern to American automobile manufacturers, according to Gilbert Redfern, assistant trade commissioner, who has just made a report covering the subject of body building in Poland to the automotive division of the Department of Commerce.

The customs duty on automobiles weighing upwards of 1500 kilograms is almost prohibitive which coupled with the contingent system which applies to imports of complete passenger cars makes domestic body building an interesting subject for American manufacturers, the report says. The matter has assumed even greater importance since the tariff regulation of last December prohibiting the stripping of cars in order to get them into a lower category, the report adds.

New Curtiss Plane Has Two Engines

NEW YORK, July 25—The Curtiss Aeroplane & Motor Co. has built and test-flown an 18-passenger transport plane of its Condor type. This plane is powered with two Curtiss Conqueror water-cooled engines of 635 hp. each, and is capable of climbing and maintaining an altitude of 5000 ft. with one engine.

Engine nascelles are mounted on the lower wing immediately over the landing gears, thus reducing vibration transmitted to passenger cabin. Equipment includes wheel brakes, radio sending and receiving outfit, gasoline dump valves, and landing and running lights. Passenger comfort is provided for by individual arm chairs adjustable to any position, adequate ventilation without drafts, steam heat, and sound and vibration-proof walls, containing 3 in. of air space between the inner and outer shell.

Chairs may be replaced by berths for the accommodation of 12 passengers for night flying. Baggage is carried in a special compartment in the engine nascelles behind the gas tank. The engines are geared two to one and drive three-bladed propellers. The framework of the new plane is entirely of metal construction.

A.S.M.E. Nominates

NEW YORK, July 26—The nominating committee of the American Society of Mechanical Engineers has selected the following names to be presented to the society for action: For president, Charles Piez, chairman of the board, Link-Belt Co., Chicago; for vice-presidents, Paul Doty, chairman of the board, Minnesota State Board of Registration, St. Paul; Ralph E. Flangers, manager, Jones & Lamson Machine Co., Springfield, Vt.; Ernest L. Jalncke, assistant secretary of the Navy, Washington, and Conrad N. Lauer, president, Philadelphia Gas Works Co., Philadelphia; for managers, Harold V. Coos, Ford, Bacon & Davis, New York, James D. Cunningham, president, Republic Flow Meter Co., Chicago, and Clarence F. Hirshfield, chief, Research Department, Detroit Edison Co., Detroit.

Bus Line Purchased

DETROIT, July 23—Control of the Village Utilities, Inc., operator of a 31-mile motor bus line from near Mt. Clemens to Detroit, has passed to the Detroit Motorbus Co. The Detroit company paid $10 a share for 669 shares of the Village Utilities stock and transferred 1191 shares on a share for share basis.

Half Earnings Lower for General Motors

Profits are $3.38 Per Common Share Compared With $3.60 Last Year

NEW YORK, July 23—The General Motors Corp. reports net earnings for the first half of the current year, including equities in the undivided profits of subsidiary and affiliated companies not consolidated as $151,860,310 as compared with $161,267,974 for the corresponding period of last year. This is equivalent to $3.38 a share on common after allowing for preferred dividends as compared with $3.60 per share last year on a comparable basis.

Earnings for the second quarter were $89,949,323 as compared with $91,799,398 last year. This is equivalent to $2.01 as compared with $2.06 last year. Last year's second quarter earnings were a record for any quarter in the history of the corporation, according to the announcement issued by Alfred P. Sloan, Jr., president.

Cash, United States Government and other marketable securities on June 30 amounted to $157,024,491. Net working capital as of June 30 was $294,451,019 as compared with $295,788,304 on Dec. 31, 1928. Net working capital is after deducting the extra dividend requirement of $13,050,000, paid July 2, 1929.

Merger Basis Announced

NEW YORK, July 26—Merger of the Sikorsky Aircraft Corp. with the United Aircraft and Transport Corp. will be on the basis of an exchange of 5/13 of a share of Sikorsky stock for each share of United Aircraft, it was learned here today. Stockholders of United Aircraft have made the merger contingent upon the deposit of 70 per cent of Sikorsky stock.

Gear Makers Change Plans

PHILADELPHIA, July 26—The annual convention of the American Gear Manufacturers Association will be held here, instead of at Briarcliffe, N. Y., as originally scheduled, it was announced today following a meeting of the directors of the association yesterday.

Two-Cycle Engine Announced

OAKLAND, CALIF., July 23—A new two-cycle radial air-cooled aircraft engine which is expected to eliminate most of the power trouble in present-day aircraft engines has been developed by the Aeronautical Engineering Co. of this city, it is announced by its officials.

Waco Declares Dividend

WICHITA, KAN., July 26—Directors of the Waco Aircraft Co. have declared an initial dividend of 25 cents per share.

M. and E. A. Index Drops 37 Points

June Figure Placed at 208, Which is Above Last Year

NEW YORK, July 23—Changing of models by car manufacturers, together with the usual seasonal trend in the trade and industry, have resulted in declines in the monthly indices of all groups of products of members of the Motor & Equipment Association, according to figures issued today. The grand index for all groups for the month of June is 208 as compared with 245 for May. It keeps well ahead of last year, however, as is evidenced by the comparison with last June when the index was 190. Practically all divisions have contributed to holding this index above last year's with the exception of accessories.

As is to be expected, with car manufacturers preparing for new models, and the usual seasonal decline in car manufacture, the index for original equipment is down from May, being 231 for June as compared with 278 for the previous month. This group, however, remains well in advance of last year when the June index was 200.

Service parts shipments from factories also shows a decline from earlier months, being 150 for June as compared with 169 for May, but holds even with last June when the index was also 150. This is also largely a seasonal trend, as most of the purchases for spring overhauling were completed prior to June.

Shop equipment shipments keep well in advance of last year, although they too have fallen below the figures established during the earlier months of the year. The index for this group for June is 186 as compared with 200 in May and 140 in June of last year. Accessories continue to be the weakest group in the industry with a June index of 90 as compared with 91 in May and 110 in June a year ago. These indices are based on January, 1925, as 100.

Wholesale trade during the month also showed some slacking off, being 32 per cent ahead of January, 1928, as compared with 42 per cent for May. A slight letting off in collections is also noted among the wholesalers, their accounts receivable for June being slightly lower than in May but not as much so as their sales.

Biflex Products Starts Construction of Plant

DECATUR, ILL., July 23 — Work has been started upon a $50,000 all-steel construction forge plant, 150 by 160 ft., for the Biflex Products Corp., here, which when completed will give the company's plant here floor space of 114,000 sq. ft.

The factory, which is scheduled to be finished in two months, will have $100,000 in equipment. Arrangement of the entire factory is being altered as the bumper business is being transferred from the Waukegan plant to this city conforming with the program of centralizing the bumper business of the company. R. F. Peterson, former plant manager in Waukegan, is being transferred to the local plant.

Auto-Lite Plan Approved by Brown Mfg. Directors

DETROIT, July 22—Directors of the J. W. Brown Manufacturing Co. have approved the plan of consolidation with the Electric Auto-Lite Co., as proposed by the latter. They have recommended the acceptance of the plan.

The proposal provides for an exchange of stock on the basis of one share of Auto-Lite for each 2¾ shares of Brown, and a special cash dividend of $1.75 a share on the Brown stock in the event 66 2/3 of the outstanding stock is deposited for exchange by Aug. 1. Cash adjustment for fractional shares of Brown stock will be made on a basis of $61 a share.

Cycle Figures Announced

WASHINGTON, July 25—Nearly 84 per cent of the 2,262,932 motorcycles registered throughout the world are registered in Europe, according to figures compiled by the Automotive Division of the Department of Commerce. European registrations increased from 1,577,167 in 1927 to 1,876,752 in 1928, nearly 19 per cent. Nearly one-seventh of the total number of motorcycles registered are American makes. In America the number of motorcycle registrations decreased from 140,847 in 1927 to 139,318 in 1928. World registrations, on the other hand, showed an increase of 16 per cent over 1927.

Manchurian Market Tight

WASHINGTON, July 25—Dealers in north and south Manchuria were reported holding large stocks of cars due to heavy imports with sales not as high as expected, says a dispatch received this week from Mukden by the Department of Commerce. Considerable difficulty is experienced in the sale of cars and other goods, says the dispatch, in the outlying districts of north Manchuria due to a new local tax of 9 per cent on all goods sold.

Argentine Imports Reported

WASHINGTON, July 25—Automotive imports into Argentina during June included 7025 passenger cars and 1320 trucks from the United States and 59 passenger cars and 18 trucks from Europe, according to a report from Buenos Aires received by the Department of Commerce this week.

Wants Spark Plug Agency

WASHINGTON, July 25 — Pedro Gonzalez, Duque de Osuna No. 1, Madrid, Spain, is anxious to secure direct factory agency for all of Spain and Portugal for spark plugs.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, July 25—There was some slight decline in jobbing trade and industrial activity last week. Building activity continues quiet. The questionable outlook of the wheat crop in the American Northwest and Canada is partly responsible for an increase in price of from 40 to 50 cents. In the Southwest the grain prospects are the best. The failure of fifteen banks in Florida resulting from frozen assets and from the effect of the fruit-fly menace is mostly local in its manifestations.

INDUSTRIAL ACTIVITY

Industrial activity in June, based on consumption of electrical energy, was 1.2 per cent below that of May and 16.1 per cent above a year ago, according to the monthly report by the Electrical World. The average rate of activity for the first half of the year was 13.7 per cent above that in the corresponding period last year.

LIFE INSURANCE SALES

Sales of ordinary life insurance throughout the United States in June were 1 per cent above those in the corresponding month last year, while sales during the first six months of the year were 7 per cent above those a year ago.

MERCHANDISE EXPORTS

Merchandise exports in June amounted to $397,000,000, as compared with $388,661,000 in the corresponding month last year, while imports were valued at $352,000,000, as against $317,249,000 a year ago. An export balance of $342,197,000 resulted from foreign trade during the first half of the year, which compares with an export balance of $292,057,000 for the first half of 1928.

FREIGHT CAR LOADINGS

Railway freight loadings for the week ended July 6 totaled 908,832 cars, which marks an increase of 57,885 cars over those in the corresponding week last year and an increase of 69,747 cars over those in the corresponding week two years ago.

STOCK MARKET

The stock market last week continued to rise. Practically all issues closed the week with net gains, while the rail stocks enjoyed substantially higher levels. Call money ranged from 7 per cent to 12 per cent.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended July 17 showed a decrease of $69,300,000 in holdings of discounted bills. There were increases of $1,700,000 in holdings of bills bought in the open market, of $17,000,000 in holdings of Government securities, and of $49,200,000 in member bank reserve deposits. The Reserve ratio on July 17 was 78.3 per cent, as against 73.0 per cent a week earlier.

Cold Finished Bars New Extras Quoted

Automotive Demand for Steel Continues Good Except on Strip

NEW YORK, July 25—Cold-finished bar makers have issued a new "card of extras," the outstanding innovation in which is inclusion of a 25 cents per 100 lb. extra on high-sulphur screw stock. Until a short time ago sulphur was looked upon as productive of little good in steel. Its presence in steel-making materials indicates to the metallurgist the danger of "red-shortness" which is liable to cause checking of the steel in rolling or cooling. German steel makers found, however, that Bessemer or open-hearth steel with a carefully controlled sulphur content ranging from 0.11 to 0.2 per cent minimum facilitates rapid cutting and for some time there has been a steady demand for this type of steel, the extra now being uniformly recognized. Extras for special finishes, turned and polished steel, etc., have been revised. Extras for small lots have been revised upwards and those for accuracy downwards.

Automotive demand for cold-finished bars is on the uptrend. Specifications and shipping orders as well as fresh inquiries from motor car manufacturers and parts makers for all steel products are encouraging. Strip mills report further easing-off in the pressure on their capacity, but their backlog of orders for certain widths is still adequate. Generally, however, prompt shipments are the rule.

Mills specializing in full-finished automobile sheets continue to operate at high capacity. Common black sheets are easy at 2.85 cents, Pittsburgh, higher prices having disappeared altogether. Small orders for cold-rolled strip have recently been booked at 2.75 cents, Pittsburgh, heretofore considered as the inside figure for representative tonnages. The 2.75 cents price level, however, maintained for large lots as well.

Pig Iron—Demand is largely of a routine character, and prices hold at unchanged levels. The market's undertone, however, reveals firmness.

Aluminum—An outstanding development of the market is the broadening demand from automotive consumers for special alloys, the number of which is increasing from month to month. Prices rule unchanged.

Copper—Consuming demand is rather backward. In the "outside" market prices asked by holders are very close to those named by producers. A good deal of Standard (unrefined) copper has been bought for American account on the London Metal Exchange by way of hedging operations. It is not thought that this will be shipped to the United States for refining, and if it should be thrown on the market in London, it would cause a sharp decline in the Standard market there, the untoward effect of which, it is feared, would be felt in the market for electrolytic. Quotably the market remains unaltered.

Tin—The spot Straits market is fairly steady at virtually the same price levels which prevailed this time last year. London cables report further progress in the plans of those who are trying to bring about a world-wide price control. There is a general feeling that prices will respond more impressively to the improved sentiment in the London market later in the year, and last quarter futures are held at a considerable premium over spot.

Lead—Steady, moderate consuming demand is noted. Prices unchanged. The Lead Industries Association estimates that 5,000,000 of the metal will go this year into the manufacture of tetra-ethyl lead used to make anti-knock gasoline.

Zinc—The market remains unchanged at 6.80 cents, East St. Louis.

Output in Canada Shows Huge Gains

DETROIT, July 23—The growth of the Canadian automobile production is demonstrated in the report on this industry for 1928 by the bureau of statistics. For the years from 1904 to 1916, the value of production was $100,000,000, while for 1928 alone, it was $162,867,495. In 1917 the number of employees was 5919, and in 1928 was 16,749. Capital invested in 1921 was $40,080,269, and in 1928 was $97,056,328. Wages paid in 1921 was $7,887,173 and in 1928 was $29,548,114.

Imports show a still more rapid increase. In 1917, the value of automobiles and parts imported was $19,426,492, while in 1928 the value had grown to $89,672,831. In 1917, imports were about 35 per cent of home production but in 1928 was 55 per cent.

Practically all imports were from the United States and exports to that country practically none. Exports in value have increased from $6,597,644 in 1917 to $36,028,431 in 1928, which is an increase over 1927, but less than in 1926 and 1925.

Shipments of Canadian passenger cars to New Zealand more than doubled, reaching 1049 valued at $553,356 and putting that market in first place. New Zealand was also the best market for low priced cars, taking 591, while British South Africa was a close second, with 585. Argentina dropped to second place although it was the principal market for passenger cars valued from $500 to $1,000.

Belgian Market is Slow

WASHINGTON, July 25—American medium-priced trucks were selling satisfactorily in Belgium during June while the automotive market generally was slow, says a report received by the Department of Commerce from Brussels this week.

Subsidiary Elects Grosvenor

NEW YORK, July 23—Graham B. Grosvenor, president of the Aviation Corp., has been elected president of its subsidiary, the Inter-State Air Lines, Inc. The Inter-State company operates an air mail and passenger route between Chicago and Atlanta.

Chrysler Profits Higher for Half

Corporation Reports Six Month Net Earnings of $18,095,239

NEW YORK, July 23 — Chrysler Corp. reports a net profit for the quarter ended June 30, after all charges, of $9,257,066, and for the first half of the year, of $18,095,239. This compares with earnings for the corresponding quarter of last year of $6,988,013, and for the first half of 1928, of $11,690,479. Earnings during the first six months are equivalent to $4.06 a share on outstanding common stock, and are greater by one-third than the total annual dividend at current rates. This compares with earnings of $3.98 a share during the first half of 1928.

The consolidated balance sheet shows current assets of $86,707,854 as of June 30, which compares with $45,784,632 as of June 30, 1928. The ratio of current assets to current liabilities was 4.05 to 1, as compared with 3.38 to 1 at the beginning of the year. Cash in marketable securities are listed at $51,678,994. During the second quarter the 5 per cent serial notes of Dodge Brothers, Inc., amounting to $2,305,000, were paid. Regular quarterly dividend of 75 cents has been declared payable Sept. 30 to stockholders of record Sept. 3.

Lane Gets New Post

WASHINGTON, July 25—Kenneth M. Lane, formerly of the Dayton Wright Co. and the Wright Aeronautical Corp., has been appointed chief of the Department of Commerce Aeronautical Engineering Section, it was announced this week. Lane is the designer of the airplane which last May broke the world's altitude record and has had four years' experience with the government at McCook Field. He succeeds Lawrence V. Kerber, who recently resigned to become associated with an aircraft manufacturing concern.

Fokker Earnings Rise

NEW YORK, July 23—Fokker Aircraft Corp. of America reports net earnings for the quarter ended June 30, before Federal taxes, of $357,427. This is equivalent to 50 cents a share on the average number of shares outstanding for the period, and compares with earnings for the first quarter of the year of $139,984. The company announced the election to the board of directors of Fred J. Fisher, C. F. Kettering, and C. E. Wilson of General Motors Corp.

Air Directory Completed

WASHINGTON, July 22—A directory of the aeronautic industry listing the names of firms and individuals manufacturing and selling aircraft and equipment has recently been completed by the Department of Commerce.

Austin Announces American Financing

Stock Issue Planned and Company Officers to be Chosen Here

NEW YORK, July 24—Definite announcement was made this week of plans to manufacture the Austin Seven car in this country. The American Austin Car Co. was incorporated some months ago under the laws of Delaware for this purpose and early this spring the company contracted with the American Steel Car Co. to purchase a part of its plant facilities in Butler, Pa., for the manufacture of the car. Announcement was made by Sir Herbert Austin in London this week, that the car was to be made in this country and sold here.

Complete details of the organization of the American company are not yet available, but it is understood on reliable authority that between 250,000 and 300,000 shares of its authorized 1,000,000 shares will be floated for public subscription in this country at a price somewhere between $12 and $15 a share, and a like amount is to be floated in England. Officers and directors of the company have not yet been elected, meetings being held late this week for that purpose, but it is understood that Sir Herbert Austin will be a member of the board, although the officers will be American, and the company itself will be independent of the British company.

The Austin Seven is a four-cylinder job, having a 75-in. wheelbase and a R.A.C. rating of 7.8. The only change to be made in the car for use in this country will be the adoption of a left-side drive. Although a few early cars may be assembled from parts sent from the British factory, the plan is ultimately to manufacture the complete car in this country. The car weighs about 950 lb. and will sell under $500, according to announcement.

Laboratories Added

SYRACUSE, July 26—For the purpose of conducting development and endurance tests on water-cooled and Franklin air-cooled engines, two new research laboratories have recently been completed at the factory of the Franklin Automobile Co. in Syracuse, N. Y. The laboratories have been designed to duplicate every type of road condition, at the same time permitting closer observation, compilation of data and the taking of measurements with an accuracy impossible on the open highway. This work is under the personal direction of C. T. Doman, research engineer.

Jackson Profits Rise

DETROIT, July 23 — The Jackson Motor Shaft Co. reports net profit of $210,624, after all charges including Federal taxes for the first six months of 1929. This is equivalent to $2.10 per share on the 100,000 shares of no par value stock outstanding. In the corresponding period of 1928, the company had net profit of $180,114, after all charges on taxes, equivalent to $1.80 per share.

Indiana Registrations Show Half Year Gain

INDIANAPOLIS, July 22—An increase of nearly 70 per cent was made in commercial car and truck registrations in the State of Indiana for the first six months of this year over the same period of last year, state department figures indicate. The total for 1929 was 7922 and for the first half of 1928 4778. June sales showed a falling off from the previous month this year, 1062 being made against 1242 in May. The month's business, however, was considerably better than that of June, 1928, when only 783 trucks were sold in the state.

A 40 per cent increase in new passenger car deliveries was shown in state department registration figures for the first six months of this year over the same period of last year. Sales showed a gain of 19,098 for the first half of 1929, when 68,844 cars were delivered, against 49,746 in the first half of last year.

General Motors Officials Touring Eastern Canada

OSHAWA, July 27—Traveling in the Bonne Entente II, luxurious motor coach built especially as the official car of General Motors of Canada, Ltd., six officials of the company left the head office at Oshawa on Monday, July 22, on a six weeks' good will tour of eastern Canada. The itinerary includes most of the towns and cities between Oshawa and Montreal.

The party is headed by H. A. Brown, vice-president and general manager, General Motors of Canada, Ltd., and includes J. H. Beaton, general sales manager of the company; H. H. Henchel, general sales manager of General Motors products (Truck and Coach Division), Ltd.; E. R. Birchard, sales manager of Pontiac for Canada; E. A. Everson, assistant sales manager of Chevrolet and Oakland for Canada; and Bradley Walker, secretary of the tour.

Gabriel Reports Loss

NEW YORK, July 24—Gabriel Snubber Mfg. Co. reports a net loss of $47,164 for the three months ended June 30. This contrasts with a net profit of $184,194, or 92 cents a share for the corresponding period of 1928. Net loss for six months ended June 30 was $93,842, as compared with profits of $275,210 or $1.37 a share for the first half of the previous year.

Champion Has Airplane Plug

DETROIT, July 26—The Champion Spark Plug Co. announces that it has begun production on a new spark plug for airplanes, to be known as the Champion Aero A.

Roberge Confirms Ford Tariff Stand

Repeats Previous Answer in Letter to Senator Reed

WASHINGTON, July 24—Substantiation of Henry Ford's position on the tariff on automobiles imported into the United States is contained in a letter written by R. O. Roberge, assistant general sales manager of the Ford Motor Co. Mr. Roberge testified before the sub-committee on metals of the Senate Finance Committee, July 18, at which time Senator David A. Reed (Rep., Pa.), who presided at the meeting, expressed regret that Mr. Ford had not seen fit to testify in person or to send a "fully informed" representative.

The text of the letter from Mr. Roberge to Senator Reed follows:

"In accordance with your request I have obtained the opinions of Messrs. Henry and Edsel Ford with reference to a countervailing duty on automobiles and trucks.

"As you learned from my testimony, the Messrs. Ford are in favor of automobiles and trucks being placed on the free list in so far as the Ford industry is concerned. This attitude, of course, eliminates any question of countervailing duty. The writer regrets his inability to answer every question concerning our tractor business, but upon reflection we know you will appreciate it as difficult in an organization as extensive as ours for any one individual to be in possession of all the details so as to answer any questions which might be asked him. A questionnaire, it would seem, would be much more practical, as it would provide an opportunity to collect the information from the various departments of the organization."

Gardner Exports Rise

ST. LOUIS, July 26—Export shipments of Gardner cars for the first six months of this year broke all records for gain over any previous like period in the company's history, according to T. F. Fowler, director of exports of the Gardner Motor Co., Inc. "A comparison of Gardner export shipments from January to June of this year, reveals the fact that these shipments exceeded those of the entire year of 1927 by a considerable margin," he said.

Bus Sales Increase

CHICAGO, July 26 — Studebaker Corp. reports an increase of 53 per cent in retail deliveries of buses and bus chasses for June over the same month in 1928. June retail deliveries of funeral coaches and ambulances were 78 per cent greater than for June, 1928, it was announced today by C. H. Wondries, manager of the commercial car department.

Whippet Prices Up, New Lists Indicate

Fifteen to 30 Dollars Increase and Two New Models Appear

DETROIT, July 23—According to new price lists supplied to Willys-Overland dealers, price increases of from $15 to $30 have been effected on all four and six-cylinder Whippets with the exception of the four-cylinder Collegiate roadster, the six-cylinder De Luxe roadster, and the six-cylinder coupe. Two new body models have also been added: a De Luxe sedan listing at $695 on the four-cylinder, and a De Luxe sedan listing at $850 on the six-cylinder model.

Both of these models carry five wire wheels and a right fender well, also special mohair upholstery. The six-cylinder De Luxe sedan also has three windows instead of two for the regular sedan. New prices on Whippet models, with increases noted, are as follows: Four-cylinder touring, $520, an increase of $25; two-passenger roadster, $525, an increase of $25; four-passenger roadster, $555, an increase of $25; Collegiate roadster, four-passenger, $595, unchanged; two-passenger coupe, $575, an increase of $25; rumble seat coupe, $600, an increase of $25; coach, $575, an increase of $25; four-door sedan, $630, an increase of $15; De Luxe sedan, new model, $695.

Six-cylinder roadster, $850, unchanged; two-passenger coupe, $695, unchanged; rumble seat coupe, $725, unchanged; coach, $725, an increase of $30; four-door sedan, $785, an increase of $25; De Luxe sedan new model, $850.

Canadian Exhibit Plans New Automotive Building

TORONTO, July 22—An automotive building to cost more than $1,000,000 and designed for the exhibiting of passenger cars, trucks, buses and accessories, is in course of construction and will be opened in connection with the Canadian National Exhibition, Aug. 23 to Sept. 7, it has been announced here. The building will be used annually both by the autumn motor show of the Exhibition and the National Motor Show of Canada in the winter.

The two-story structure will be 446 ft. in length and 294 ft. in depth. It will be constructed of stone, steel and brick, with concrete flooring on the main and mezzanine floors, permitting 95,000 sq. ft. of display space on the ground floor, and an additional 25,000 sq. ft. on a mezzanine.

Willard to Build Plant

CLEVELAND, July 24—The Willard Storage Battery Co. will erect a new $1,000,000 plant in Los Angeles, R. C. Norberg, president of the company, announced here today. At the same time, further announcement of Willard activities on the Pacific Coast, which the company claims will revolutionize the battery situation in that part of the country, was promised shortly. The new plant will be the third separate unit of the Cleveland company, and will have a daily capacity of 2000 batteries.

Reo Earnings Higher

DETROIT, July 24—Net profit of $1,000,144, after depreciation and Federal taxes, for the quarter ended June 30, is reported by the Reo Motor Car Co. This is equivalent to 57 cents a share, on shares of $10 par value, earned on 2,000,000 shares of stock. This compares with a net profit of $537,514, or 26 cents a share earned in the preceding quarter.

Cardinal is in Production

ST. LOUIS, MO., July 22—An approved type certificate has been issued by the Department of Commerce to the St. Louis Aircraft Corp., covering the Cardinal two-place cabin monoplane, according to Edwin B. Meissner, president and general manager of the corporation. Following the receipt of the certificate the plane was immediately put into production and deliveries have already been made.

Report Plane Orders

NEW YORK, July 22 — American Aeronautical Sales Corp., American Licensee of the Savoia Marchetti airplanes, has received advance orders for 36 flying boats and amphibians, totaling a gross amount of $430,000. This company reports that work on its Port Washington, Long Island, plant is progressing, and meantime it is importing a few planes from the Italian manufacturing company.

Toledo Employment Declines

TOLEDO, July 23—Toledo automotive plants are showing some signs of midsummer slump but employment is still about eight per cent ahead of the same time last year. Fifty-one major plants reported 38,408 workers employed this week as against 35,769 in the corresponding week last year. This was a net decline of 1215 employees since last week.

South African Sales Poor

WASHINGTON, July 25—A poor agricultural season, election, and late rains have retarded automotive sales in South Africa during the second quarter of the year, according to a cable from Johannesburg received by the Department of Commerce this week. The cable calls attention to a 24 per cent reduction in South African railway freight charges on motor cars.

Oakland Adds Space

DETROIT, July 24 — The Oakland Motor Car Co. is adding one floor to the personnel building at Pontiac, Mich. The additional space will be used for the paymaster's offices.

Tire Dealers Plan Nationwide Chain

Independent Stores Propose to Merge Through Association

CHICAGO, July 24 — A proposed merger of several thousand independent tire stores into a $100,000,000 chain was announced here yesterday following a meeting of the board of directors of the National Tire Dealers Association. Details of the merger are to be submitted to the membership of the association at its annual convention in Chicago next November.

The new organization would be known as the United Tire Stores Corp., and would weld the independent dealers into one gigantic concern, according to an announcement of the board. The combine would effect economy of operation and meet changed conditions in the automobile and tire industries.

The association is headed by H. V. Eva, of Duluth, Minn., as president. Other officers are S. B. Harper, Fort Smith, Ark., first vice-president; Thomas F. Lane, Jersey City, N. J., second vice-president; Tom Barbee, Louisville, Ky., secretary; and J. H. Linnehan, Boston, Mass., treasurer.

Indiana Registrations Drop

INDIANAPOLIS, July 26—Seasonal declines which have been apparent in passenger car sales in Indiana since the peak month of March, became even more pronounced during June, and although figures just compiled by the state department of motor car registrations show a drop of 19 per cent from May new car sales for the entire state but the total of 10,767 represents a gain of 7 per cent over June of last year.

Truck Franchise Wanted

WASHINGTON, July 25—Exclusive representation for an American truck, having a price range from $1,000 to $5,500 and capacities from 1½ to 7 tons, for China, is being sought by a Shanghai firm, according to the Department of Commerce. American truck manufacturers interested are asked to communicate with the automotive division of the department.

Chrysler Entertains Salesmen

DETROIT, July 22—Three hundred and fifty champion salesmen were here today as the guests of Walter P. Chrysler. They are winners of the "On to Detroit" contest conducted by the Chrysler Sales Corp.

Goodrich to Start Building

ATLANTA, GA., July 22—It has been announced by the B. F. Goodrich Rubber Co. that work is to be started soon on the new $1,500,000 plant this company will erect in Atlanta, probably about Aug. 1.

Men of the Industry and What They Are Doing

Ford Predicts Increase in Wages for Employees

Information that Henry Ford plans to increase the wages paid to his employees at "no very distant time" is contained in an interview with the manufacturer appearing in the current issue of the *North American Review*. While executives of the company have been unable to supplement the information, the interview quotes Henry Ford as saying:

"It is from the $5-a-day payment that our real business dates. We think a minimum is safer than a maximum. It prevents any possibility of our slipping backward, while it does not hinder us from going forward. I regard the $6 minimum as certain to be raised again at no very distant time."

Reo Promotes Smith

E. A. Smith, president of the Reo Motor Car Co. of Cal., has been transferred to Lansing, Mich., to become assistant sales manager in charge of all Reo branch operations throughout the United States. W. A. B. Hanchett, head of the retail sales department here, has been chosen to succeed Mr. Smith as president of the California company. Mr. Smith has left for Lansing to assume his new duties. He has been identified with the Reo organization in California for more than seven years.

Plummer Is Promoted

Robert K. Plummer has been made assistant sales manager of Gears & Forgings, Inc. Before receiving this appointment he was manager of the Indianapolis office of the company. George W. Davis, formerly of the Chicago office of Gears & Forgings, has been transferred to Indianapolis to fill the place vacated by Mr. Plummer.

Curtice Goes to Europe

Harlow H. Curtice, vice-president and assistant general manager of the AC Spark Plug Co., sailed recently for a five weeks' business trip abroad. Besides visiting the AC plants at Birmingham, England, and Clichy, France, Mr. Curtice will spend some time in other European countries.

Auburn Appoints Nedeau

Howard M. Nedeau, formerly Canadian representative of the Auburn Automobile Co., has been appointed European representative, according to R. S. Wiley, export manager of the company.

McDarby Completes Trip

N. E. McDarby, director of sales of the Auburn Automobile Co., has just completed a trip through the eastern part of the United States, visiting Auburn dealers and distributors.

Reynolds Is Elected to Harvester Board

The International Harvester Co. recently elected Arthur Reynolds, chairman of the board of the Continental Illinois Bank & Trust Co., a director. Mr. Reynolds succeeds Robert P. Lamont, formerly head of the American Steel Foundries, who was made Secretary of Commerce in President Hoover's cabinet. John P. Wilson was elected consulting counsel of the company. E. C. Wampler was elected vice-president and a member of the board.

Lea Resigns From Moline

Robert W. Lea has resigned as vice-president and director of the Minneapolis-Moline Power Implement Co., to become associated with the industrial department of a New York financial house. Mr. Lea, whose industrial career in Moline extends back 20 years, was president of the Moline Implement Co. after its organization in 1924, following dissolution of the Moline Plow Co. and he was instrumental in getting the International Harvester Works located in Moline. He was identified with the manufacturing, export trade and sales departments and in general management of the Moline Plow Works prior to the war, during which he served under General Goethals in the purchase, storage and traffic division. Returning he became general manager of the Stephens Motor Car Co., the automobile division of the Moline Plow Works, prior to the organization of the Moline Implement Co.

Olds Appoints Riley

The appointment of E. E. Riley as manager of the Cincinnati branch of the Olds Motor Work is announced by D. S. Eddins, vice-president and general manager of the Olds Motor Works. Mr. Riley succeeds R. C. Gilmer, who has been promoted to the general sales department of the company. Mr. Riley will have full charge of all Oldsmobile Six and Viking Eight sales activities in the Cincinnati territory.

Perfect Appoints Keeling

C. N. Teetor, president of the Perfect Circle Co., has announced the appointment of Hal R. Keeling, of Indianapolis, as a director of the company. Mr. Keeling, who is vice-president of Sidener, Van Riper & Keeling, Inc., fills the place vacated by E. J. Winters, of Chicago.

Bradley Leaves A. C. C. as its General Manager

Samuel S. Bradley, general manager of the Aeronautical Chamber of Commerce, since its inception in 1921, has resigned to devote his entire time to the Manufacturers' Aircraft Association, of which he has also been manager since its inception in 1917. The latter is the Patent Cross-Licensing body of the industry and Mr. Bradley has felt that its activities will now require his full time.

In announcing Mr. Bradley's resignation, Frederick B. Rentschler, president of the chamber, made public a resolution adopted by the board of governors, expressing its deep regret at the loss of Mr. Bradley's association and attributing to him the credit for much of the work that has made the chamber successful.

Schultz Leaves Doehler Die

John A. Schultz, Jr., who has been manager of the Doehler Die Casting Co. plant in Toledo for more than ten years, has resigned. He has not yet announced plans for the future beyond saying he will take a vacation. J. A. Tallman is in charge of the Toledo plant but no permanent appointment has been made as yet. Mr. Schultz served as president of the Merchants & Manufacturers' Association and is now a member of its board.

Pierce-Arrow Appoints Jarvis

John H. Jarvis has been appointed custom body manager of the Pierce-Arrow Motor Car Co., it was announced recently by George E. Willis, vice-president in charge of sales. For the past four years Mr. Jarvis has been associated, as sales manager, with one of the builders of custom bodies.

Jones Appoints Sutton

Announcement has been made by the W. A. Jones Foundry & Machine Co., Chicago, of the appointment of Walter M. Sutton as manager of its Pittsburgh office. Mr. Sutton formerly was in charge of the St. Louis office for the company.

Connors Leaves Republic

James H. Connors, president of the Republic Rubber Co., has resigned his position, it is announced. He formerly was vice-president and general manager, succeeding John J. Watson in 1927.

Kelly Returns From Far East

H. H. Kelly, special representative for the Hudson Motor Car Co., has recently returned from a trip to the Far East, during which he traveled 35,000 miles in five and a half months.

Assets of Hudson Total $81,427,093

Statement Shows Increase From $68,238,084 in Half Year

DETROIT, July 22 — Showing the company in the strongest position it ever has known, Hudson Motor Car Co. made public today a condensed comparative balance sheet which discloses the progress made in the first six months of 1929. From Dec. 31, 1928, to June 29, 1929, the dates of comparison, the statement shows that cash, government securities, sight drafts and receivables rose from $25,021,685 to $40,988,104. Surplus increased from $35,611,084 to $42,143,318 and total assets from $68,238,084 to $81,427,093.

This statement follows the earnings report for the first six months of 1929, which established a new high record for first half results.

The company has reported a net income of $10,621,512 for the first six months of 1929, equal to $6.65 a share, as compared with $9,216,321, or $5.77, in the same period last year. The profit for the second quarter of this year was $6,053,730, or $3.79 a share, as compared with $5,008,949, or $3.14, in the corresponding quarter of 1928.

The comparative balance sheet reflects not only this highly active business but also the company's low inventories and generally liquid condition. The statement is as follows:

Condensed Comparative Balance Sheet

Assets	June 29, 1929	Dec. 31, 1928
Cash and Marketable Securities	$30,400,808.08	$20,014,640.46
Sight Drafts, Accounts Receivable	10,587,296.28	5,007,044.91
Inventories	11,506,649.34	13,167,880.38
Investments	38,510.00	39,860.00
Real Estate, Plant and Equipment	28,731,914.52	29,072,337.68
Deferred Expenses	161,914.43	935,320.75
	$81,427,092.65	$68,237,084.18
Liabilities		
Accounts Payable, Accrued Expenses, etc.	$12,754,218.69	$ 7,836,989.15
Dividends Declared	2,044,950.00	2,044,950.00
Reserves, Taxes and Miscellaneous	4,526,355.38	2,785,813.61
Capital Stock	19,958,250.00	19,958,250.00
Surplus	42,143,318.58	35,611,081.42
	$81,427,092.65	$68,237,084.18

Ex-Cell-O Stock Listed

DETROIT, July 23—The Detroit Stock Exchange has admitted to trading 200,000 shares of Ex-Cell-O Aircraft & Tool Corp. stock. Forty thousand shares of this issue were recently sold by the corporation to provide funds for an expansion program which will include the purchase of additional land, buildings and equipment.

Libbey Split Approved

TOLEDO, July 23 — Stockholders unanimously approved change in name and four-for-one split-up of common shares of Libbey-Owens Glass Co., maker of non-shatterable and polished plate glass for the automobile trade. The company will have 3,500,000 shares of no par common in place of its 1,000,000 shares of $25 par common authorized. Dividends will be doubled after a four-for-one split-up of present shares putting new stock on a dollar a year basis. The Graham brothers are heavily interested in the company.

Airway Hearing Planned

WASHINGTON, July 25—A hearing on the feasibility of establishing a civil airway between New York and St. Louis and another from St. Louis via Tulsa, Okla., to Dallas and Fort Worth, Tex., will be held here on Aug. 1, it was announced by the Interdepartmental Committee on Airways this week.

Financial Notes

Timken Roller Bearing Co. reports net earnings for the six months ended June 30, after all charges of $8,449,198. This is equivalent to $3.51 a share on the common stock outstanding, and compares with $6,395,572, or $5.52 a share on stock outstanding at the end of corresponding period of 1928. Net income for the quarter ended June 30 was $4,184,973, or $1.74 a share, as compared with $4,264,225 for the corresponding quarter of 1928.

Budd Wheel Co. announces net earnings for June, after all charges including provision for federal taxes of $205,676. For the first six months of 1929 net earnings after all charges total $1,216,696. This surpasses the earnings of any 12-month period in the company's history. After paying the current preferred dividends the first six months' earnings show $5.20 per share on the 225,515 common shares outstanding.

Air Way Electric Appliance Corp. of Toledo, of which H. G. L. Campbell is local manager, reports operating income for the first half of 1929 of $1,032,099, as compared to $836,999 for similar period of 1928. The earnings per share after depreciation and Federal taxes were $2.05, as compared to $1.72 for the first half of 1928.

Winton Engine Co. reports net earnings after all charges for the six months ended June 30, of $384,511. This is equivalent to $5.22 a share for outstanding stock, and corresponds with $210,189, or $7.00 a share on preferred stock for the corresponding period of 1928.

Motor Products Corp. reports for the six months ended June 30, 1929, net profit of $1,729,341 after charges, depreciation and provision for Federal and Canadian income taxes. This compares with net profit of $1,168,020 in first half of 1928.

Ross Gear & Tool Co. reports a net profit for first six months of 1929 of $436,336 or $2.90 a share on 150,000 common shares after all charges including depreciation and taxes against $373,962, or $2.49 a share in like 1928 period.

Moto Meter Co. stockholders have approved the plan of merger with the Safe-T-Stat Corp., to form a new company to be known as the Moto-Meter Gauge and Equipment Co.

Hall Lamp Co. reports for the six months ended June 30, 1929, a net profit of $815,722, after charges and Federal taxes, equal to $2.04 a share earned on 400,000 shares of no par stock. This compares with net profit of $419,902, or $1.04 a share, for the first six months of 1928. Net profit for the second quarter was $404,173, after above charges, equal to $1.01 a share, which compares with $411,549, or $1.03 a share, in the preceding quarter and $224,902, or 56 cents a share, in the second quarter of 1928.

Wright Aero Corp. gross sales for second quarter of current year were about $3,000,000 and net income, after interest, depreciation and federal taxes, was about $900,000, or $1.50 a share on 600,000 common shares. Second quarter 1928 net was $621,978, or $2.07 on 300,000 shares. Six months' net income this year will be about $1,434,000, or $2.40 on present stock, against $1,092,000, or $3.64 on 300,000 shares in first six months of 1928.

Central Alloy Steel Corp. earnings for the first half of 1929 were $3,324,277, or equal to $2.29 a share on common stock outstanding, according to the semi-annual report made Saturday by F. J. Griffiths, chairman of the board of directors of the company. This is a substantial increase over earnings for the first six months of 1928, which were $2,240,359, or $1.46 a share.

Grand Rapids Metalcraft Corp. reports net earnings of $146,289.64 for the first six months of this year after providing for taxes, depreciation and reserves, an increase of $9,998.71 over the same period in 1928, and $73,536.44 more than was earned in the corresponding period of 1927.

North American Aviation, Inc., reports a net profit of $1,172,080 for six months ended June 30, 1929, after expenses and federal taxes equivalent to 58 cents a share earned on 2,000,000 no par shares of capital stock.

Chicago Yellow Cab Co. had a second quarter net profit of $532,672 against $452,060 in the June, 1928, period. Net profit for the first six months was $1,196,691 compared with $957,843 for the period last year.

Hupp Motor Car Corp. reports net profit for the four months ended April 30, of $2,062,093, after all charges. This is equivalent to $1.51 a share on outstanding stock.

Monarch Plant Nearly Ready

ROCKFORD, ILL., July 23—The first unit of the Monarch Aircraft Industries, Inc., plant is scheduled to be finished within two weeks and the company is preparing to move from its temporary location. The factory is 150 by 170 ft. It is expected that work on the second unit will begin soon and it is possible the company will launch a third factory building this year.

Glass License Awarded

HARTFORD CITY, IND., July 22—The Johnson Glass Co. here has been licensed to manufacture non-shatterable glass under the patents held by the Triplex Safety Glass Co.

Survey of Automotive Employment in June Shows Activities at Unusually High Level

WASHINGTON, July 25 — While some curtailment was reported in the automotive industry during the month of June, operations generally were above the average level for that month, according to the monthly employment survey conducted by the U. S. Employment Service and made public this week at the Department of Labor.

The decrease in employment in the automotive and allied industries usually apparent in June, according to the survey, was hardly perceptible compared with previous years. Plants manufacturing airplanes and motors reported increased employment and there was no reported letdown in the rubber tire industry. Road construction was under way in practically every state, the report notes.

Following is a summary of conditions in the automotive and allied industries for the principal producing states:

New York: General — Plants manufacturing automobile parts reported scarcity of skilled mechanics, automobile plants engaged additional helpers, airplane plants worked at high level; Buffalo District—Full forces employed in automobile plants but slight curtailment in two toward end of month; Yonkers—Tarrytown plant maintained high production rate, plans for $2,000,000 addition to automobile factory; Jamestown District—Automobile accessory plants worked overtime.

New Jersey: General—Airplane industry engaged additional forces; Paterson—Aeronautical industry operated satisfactory schedules.

Pennsylvania: General — Automobile accessory plants busy; Philadelphia District—Storage battery plants engaged additional workers; Pittsburgh District—Plate glass plants operated at high rate; Reading — Accessory plants on full schedules; Williamsport —Two large automobile manufacturing plants closed down at end of June for mid-year inventory.

Michigan: General—Automotive industry maintained high operating schedules and employed large forces; Detroit District—Surplus of automobile-factory labor was apparent; Flint —Small surplus of automobile workers; Bay City—Large automobile factory operated overtime and expects to continue schedules; Lansing—Some curtailment in automobile plant operation.

Ohio: General—Tire plants busy; Cleveland—Automobile manufacturing plants worked at high level, showing some seasonal curtailment; Toledo—Curtailment of employment in automobile factories; Akron—Rubber factories particularly busy; Mansfield—Tire factory closed.

Missouri: General—Automobile assembling plants employed normal forces; St. Louis—Assembling plants operated with usual number of workers.

Iowa: General—Assembling plants reported normal forces with additional workers employed at Des Moines.

Colorado: General—Additional workers employed in assembling plants; Denver—Scarcity of automobile mechanics reported.

Logan Gear Co. Acquires Bingham Stamping & Tool

TOLEDO, July 22—The nucleus for another strong organization to supply parts and accessories to automobile manufacturers is seen here in the acquisition of the Bingham Stamping & Tool Co., by the Logan Gear Co., formerly the Logangear Products Co., under the leadership of C. O. Miniger, president of the Electric Auto-Lite Co. The combined companies represent more than $2,000,000 of assets, including two Toledo plants now operating at capacity.

Mr. Miniger is to be chairman of the board; J. B. Nordholt, president and general manager; Daniel H. Kelly, vice-president; F. H. Landwehr, secretary and treasurer, and other directors include George D. Welles, attorney; L. H. Gould, real estate operator, and G. L. Mouen, local broker.

The Bingham unit will continue to operate under the management of Jeremiah Bingham, president, and W. H. Schomburg, vice-president. It will be a wholly owned subsidiary of the new Logan Gear Co. The Bingham plant employs nearly 200 men and makes stampings for automotive companies and also does some business in radio, household appliances and juvenile vehicle trade.

Simplex Aircraft Obtained

DEFIANCE, OHIO, July 23—The Simplex Aircraft Corp. of Defiance, which has been operating about a year, has been absorbed by the Aero Corp. of America, chartered under Delaware laws. The company has acquired all of the common stock of the Simplex Co. as well as all of the bonds of the Covert Gear & Manufacturing Co., of Lockport, N. Y. The purchasing company announces that expansion of the Defiance plant will be made at once.

Ohio Sales Favorable

COLUMBUS, OHIO, July 22—The Ohio Council, National Automobile Dealers' Association, in a tabulation showing sales of motor vehicles in eight of the most populous counties in Ohio for June shows a total of 16,505 sales of passenger cars during the month, compared with 18,425 in May this year, which is the usual decline. For the first six months of the year sales of passenger cars numbered 89,687, which is an increase of 44 per cent over the sales for the corresponding period in 1928.

Committee Plans Meeting on Distribution Census

WASHINGTON, July 25—The Advisory Committee of the Census of Distribution will reconvene next September to consider progress made in accordance with preliminary plans worked out at the committee's first meeting held here July 18.

The distribution of census will be gathered as a part of the regular 1930 population census and is expected to aid materially in the solution of the numerous distribution problems which now confront manufacturers, wholesalers and retailers. The committee, composed of economists, statisticians and business men, has adopted a preliminary plan for the collection of statistics.

Clark Equipment Obtains Control of Frost Gear

DETROIT, July 22—Clark Equipment Co., Buchanan, Mich., has acquired 60 per cent of the common stock of the Frost Gear & Forge Co., it is announced by A. S. Ford, president of the Frost company. The acquisition, effected through exchange of stock, strengthens the position in the automotive parts industry of the Clark company, which already is a leading manufacturer of axles, wheels, brakes, transmissions, twist drills and gasoline propelled haulage vehicles.

The Frost Gear & Forge Co. has extensive trade in commercial forging of gear blanks and cutting of gears. The plant is located at Jackson, and its common stock is listed on the Detroit Stock Exchange.

Boat Model Announced

TOLEDO, July 23—Dart Boats, Inc., controlled by Toledo capitalists and automotive men, has announced a new moderate-priced runabout model speedboat to go into production at once in its Toledo plant. The new model is 18½ ft. long, constructed of mahogany, powered with 60-hp. Gray Continental motor, designed to make 30 m.p.h., and priced at $1,595.

Worcester Steel Building

WORCESTER, MASS., July 22—The Worcester Pressed Steel Co. is erecting a four-story steel frame office building which will contain 50,000 sq. ft. The new structure will release about 20,000 sq. ft. for manufacturing purposes in buildings now devoted to office use, according to J. N. Mowery, general manager.

Jig Bushing Expanding

DETROIT, July 22—The Jig Bushing Co. of Pontiac, Mich., is erecting a $30,000 building which will triple the present floor and production capacity.

Policies of Willys Will be Unchanged

Bancroft is Appointed General Purchasing Agent; Miniger Defines Stand

TOLEDO, July 23—There will be no change in Willys-Overland personnel or policies as a result of the change in management, it has been announced here by Linwood A. Miller, president, who has succeeded John N. Willys as the president of the company.

George H. Bancroft, who has been with the company in its purchasing department for nine years, has been named general purchasing agent, to succeed the late W. B. Calkins, it was announced by the new president.

Mr. Bancroft was graduated from University of Michigan in 1912 with a mechanical engineering degree. He taught for a time and then entered the automotive industry with the Oakland unit of the General Motors Corp. in 1919. A year later he came to Toledo to join Willys-Overland and has been in the purchasing department ever since.

C. O. Miniger, chairman of the executive committee, has made plain in a statement to the press that he does not dominate Willys-Overland and does not aspire to control of its affairs.

"My chief business enterprise is the Electric Auto-Lite Co., the direction of which calls for all the time and energy I can summon," he stated.

"As an investor it has been my practice to buy largely of motor stocks, and in addition to Willys-Overland, I hold Nash, Hudson and other issues. No one believes more strongly than I in the future of the industry."

Pontiac Pattern Gains

DETROIT, July 22—The Pontiac Pattern & Engineering Co. showed an increase of 29 per cent in total sales for the first six months of 1929 over the same period last year. The company recently enlarged its plant and expects its volume of business to expand 50 per cent this year over last year's mark.

To Produce Plane

SPRINGFIELD, MASS., July 20—Preparations for manufacturing a light plane with wing spread of 27½ ft. and overall length of 20½ ft. are under way by Granville Aircraft Corp., of which Zantford D. Granville is president. Production space will be available at the start in a hangar that has just been completed at Springfield Airport.

Crude Rubber Quiet

NEW YORK, July 23—Record breaking inventories of tires and tubes, as indicated by the Rubber Manufacturers' Association statistics, followed by the announcement of a 10 per cent reduction in production, and a cut in prices, by a large mail order house, have had a depressing effect on the crude rubber market, according to F. R. Henderson Corp. As a result, trading on the market has been comparatively quiet and prices have shown a gradual lowering. Arrivals of crude rubber at all ports in the United States for the first 19 days of July are estimated at 19,000 tons. Stocks of rubber on hand in Singapore, Penang, and so on, as of June 30, are placed at 33,040 tons, as compared with 32,710 tons as of May 31. Stocks in London have increased 130,661 tons, with stocks in Liverpool up to 4547 tons.

Hercules Motors Starts Expansion of Factory

CANTON, OHIO, July 23—Ground has been broken for the construction of the first two new factory units of the plant of the Hercules Motors Corp., as a part of a $500,000 expansion program. Contract for the new buildings has been awarded to the E. J. Landor Co. here.

The first new unit will increase the floor space of the plant by approximately 50,000 sq. ft. Construction of the second building is to be started soon. This will give the plant 20,000 sq. ft. of additional floor space. Both structures are to be completed by Oct. 1.

The expansion program is expected to increase plant production about 60 per cent, according to an official of the company, and employment will be given to more than 500 additional men. The company now employs approximately 1000 men.

Fafnir Has Plane Bearings

NEW BRITAIN, CONN., July 22—A series of ball bearings particularly adapted for airplane control mechanisms has just been made available to plane manufacturers by the Fafnir Bearing Co., of New Britain, Conn.

These bearings, known as the "S" series, are of the single row radial type with inch dimensions and narrow widths. They are available in bores from ¼ in. to 1 in.

Reserve Air Show Space

NEW YORK, July 22—Applications for space in the 1930 New York Aircraft Salon, to be held by the Aeronautical Chamber of Commerce of America, May 3 to 10, in Madison Square Garden, have been received from 19 dealers and distributors of aircraft in the New York metropolitan area. These dealers and distributors represent 25 different types of aircraft, including most of the better known planes.

Budd Adds Stations

PHILADELPHIA, July 23—Thirteen new service stations, making over 200, specially equipped to serve owners of Budd all-steel automobile bodies, have been added to its nation-wide chain since the first of this year, according to announcement by officials of the Edward G. Budd Mfg. Co., of Philadelphia and Detroit.

Production in Half Fixed at 3,411,451

Government Figures Show Gain of 1,084,942 for Six Months

WASHINGTON, July 25—The total June production of 566,744 units for the United States and Canada, as fixed by the Department of Commerce and announced last week in *Automotive Industries*, consists of 470,467 passenger cars and 96,277 trucks. These figures compare with 542,502 passenger cars and 93,077 trucks for May and with 381,963 passenger cars and 43,232 trucks for June, 1928. The compilation by the Department of Commerce is made from reports of 151 manufacturers in this country and from the Dominion Bureau of Statistics.

The June total production compares with an output of 425,195 units for the same month in 1928 and with a production of 635,579 units for the previous month of this year.

Production for the first half of this year was 3,411,451 units compared with 2,326,509 in the corresponding period of last year, a difference of 1,084,942 units.

The following table is based on the Department of Commerce report and shows revised figures for March, April and May of this year:

	Cars	Trucks	Total
1928			
Jan.	212,351	27,840	240,191
Feb.	301,466	34,834	336,300
March	387,048	43,735	430,783
Apr.	385,394	48,921	434,315
May	405,627	54,098	459,725
June	381,963	43,232	425,195
Total....	2,073,849	252,660	2,326,509
July	358,914	58,398	417,312
Aug.	424,867	67,676	492,543
Sept.	375,463	61,044	436,507
Oct.	353,162	62,658	415,820
Nov.	225,608	43,401	268,909
Dec.	212,727	30,814	243,541
Total....	4,024,590	576,551	4,601,141
1929			
Jan	366,610	55,927	422,537
Feb.	433,400	64,239	497,639
March ...	548,178	*77,537	625,715
Apr.	573,303	*89,934	*663,237
May	542,502	*93,077	*635,579
June	470,467	96,277	566,744
Total....	2,934,460	476,991	3,411,451

*Revised

Studebaker Making Bid

SOUTH BEND, July 23—With new safety bodies designed especially for the protection of children, the Studebaker Corp. is making a bid for school bus business which is expected to add considerably to its commercial car sales. A survey shows that 40,875 school buses are now operated for 15,930 schools and this number will be greatly increased in the fall, according to plans for expansion made by educational boards.

Cord is Interested in New Plane Firm

INDIANAPOLIS, IND., July 23—Articles of incorporation filed here with the state secretary for the Corman Aircraft Corp. of Indiana, revealed the plans of E. L. Cord, president of the Auburn Automobile Co., to enter the aviation industry with an airplane factory at Connersville where Auburn has extensive automotive holdings and operations.

Capital stock of the company will be 500 shares of $100 par value and the objects set out in the application for incorporation are to manufacture, sell, buy, import and deal generally in airplanes, dirigibles, balloons and hydroplanes. Incorporators are Mr. Cord, L. E. Manning and Raymond S. Pruitt, associated with the Auburn Co., who are now operating an experimental plant at Dayton, Ohio.

Industrial leaders and civic groups of Connersville for some time have been negotiating with Mr. Cord and his associates in an effort to bring the airplane factory to Connersville and it is believed that definite steps for actual production will be taken soon by the newly formed company.

A bond issue of $50,000 for the establishment of a municipal airport is now being arranged by the Connersville council.

Export Unit Formed

DETROIT, July 22—The United Aircraft & Transport Corp. today announced formation of United Aircraft Exports, Inc., a subsidiary to handle its export business. F. B. Rentschler, president of the United Aircraft and Transport, is chairman of the board of the new company, and Francis H. Love is president. The directorate includes William E. Boeing, of Seattle Wash., founder of the Boeing aircraft factories.

Attention Called to Classification

WASHINGTON, July 25—The attention of automotive manufacturers and exporters has been called to changes made in the export classifications which became effective Jan. 1, 1929, by A. W. Childs, acting chief of the Automotive Division of the Department of Commerce. In a statement sent to manufacturers and exporters this week, Mr. Childs pointed out that a number of persons and firms are not using proper classification in listing their exports.

Packard Unit Completed

DETROIT, July 23—Structural work on the new aircraft engine factory built by the Packard Motor Car Co. has been completed. Offices of the aircraft engineering and sales division of the Packard company are now located at the new aircraft plant and have already been occupied by the aeronautical staff. Experimental production of the new Diesel engine is being carried on in the main plant at present, preparatory to finally putting this engine into commercial production as soon as the new plant is completed.

Gasoline Ruling Reported

WASHINGTON, July 25—According to a radiogram received this week by the Commerce Department from Commercial Attache A. W. Hodgman, Budapest, effective Sept. 1, 1929, all motor gasoline in Hungary must be composed of 80 per cent gasoline and 20 per cent alcohol.

Aircraft Firm Gets Studebaker Space

DETROIT, July 23—The Detroit Aircraft Corp. has leased approximately 50,000 sq. ft. of floor space in the Studebaker plant on Campau St., between Jefferson Ave. and Fort St., and will concentrate its executive offices and manufacturing operations there, it was announced yesterday by E. S. Evans, president.

The Studebaker plant has been vacant since the company moved most of its manufacturing operations to South Bend several months ago. It is so constructed and equipped as to be readily adaptable to the "line" method of airplane construction, which Detroit Aircraft plans to use, modeling its operations after the methods which the automobile industry has found practicable in reducing costs to a minimum.

Eastman Aircraft Corp., which manufactures flying boats, will move from its present plant in Detroit into the new quarters within a week. Operations on the Blackburn line of planes and Marine Aircraft Corporation's six-place metal amphibian also will be centered in new plant immediately.

Prest-O-Lite Adds Plants

NEW YORK, July 20—The Prest-O-Lite Co., Inc., has recently added two new acetylene gas plants located at Wichita, Kansas, and at Youngstown, Ohio. These plants will supply local industry with dissolved acetylene for oxy-acetylene welding and cutting.

Fedco Ships 1,000,000th

NEW YORK, July 23—The 1,000,000th Fedco number plate was recently manufactured by Fedco System, Inc. This plate was included in a shipment to the Chrysler Corp. at Detroit, which since July, 1925, has been giving Fedco protection to its car owners.

Calendar of Coming Events

SHOWS

International Aircraft Exhibit, Coliseum, Chicago ..... Sept. 7-15
National Machine Tool Builders' Exposition and Congress, Cleveland, Sept. 30-Oct. 4
Paris, Automobiles ..... Oct. 3-13
London, Automobiles ..... Oct. 17-26
Prague, Automobiles ..... Oct. 23-30
Paris, Motorcycles ..... Oct. 23-Nov. 3
M.&E.A. Show and Convention, Chicago ..... Nov. 4-9
N.S.P.A. Show and Convention, Detroit ..... Nov. 11-16
Berlin Auto Salon ..... Nov. 14
London, Trucks ..... Nov. 7-16
Paris, Trucks ..... Nov. 14-24
London, Motorcycles ..... Nov. 30-Dec. 7
Brussels Auto Salon ..... Dec. 7
New York National ..... Jan. 4-11
Chicago National, Coliseum ..Jan 25-Feb. 1

CONVENTIONS

Second Pan-American Congress of Highways, Rio de Janeiro ..... Aug. 16-31
American Welding Society, Fall Meeting and Exposition, Cleveland ..... Sept. 9-12
American Institute of Mining and Metallurgical Engineers, Cleveland, Sept. 9-12
American Society for Steel Treating, Convention and Exposition, Cleveland ..... Sept. 9-13
American Chemical Society, Fall Meeting, Minneapolis ..... Sept. 9-13
A.S.M.E.—Iron and Steel Division—National Meeting, Cleveland ..... Sept. 9-13
Society for Electrical Development, New York City ..... Sept. 13
Eastern States Exposition, Springfield, Mass. ..... Sept. 15-21
American Electric Railway Association, Atlantic City ..... Sept. 28-Oct. 4
National Industrial Advertisers Assn., Cincinnati ..... Sept. 30-Oct. 2
National Safety Congress, Annual, Chicago ..... Sept. 30-Oct. 4
Penna. Automotive Association, Erie, Pa. ..... Oct. 7-8
Permanent International Association of Road Congresses, Sixth Session, Washington, D. C. ..... Oct. 7-11
Society of Industrial Engineers, Detroit ..... Oct. 16-18
National Hardware Association, Atlantic City ..... Oct. 21-24
Society of Industrial Engineers, Sixteenth Annual Meeting, Hotel Statler, Cleveland ..... Oct. 23-25
World Engineering Congress, Tokio, Japan ..... Oct. 29-Nov. 22
National Automotive Parts Association, Detroit ..... Nov. 6-8
Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13
National Automobile Dealers Association, New York City ..... Jan. 6
American Roadbuilders Association, Atlantic City ..... Jan. 11-18
National Automotive Dealers Association, Chicago ..... Jan. 27-28

RACES

Spanish Grand Prix ..... July 31
British Tourist Trophy Race ..... Aug. 17
Akron ..... Aug. 18
National Air Races and Show, Cleveland, Aug. 24-Sept. 2
European Grand Prix, Italy ..... Sept. 8
Syracuse ..... Aug. 31
Altoona, Pa. ..... Sept. 2
Schneider Trophy (Aeronautical), Calshot, England ..... Sept. 7
Cleveland ..... Sept. 15

S. A. E.

Aeronautic Meeting, Cleveland ..Aug. 26-28
Production Meeting, Cleveland ..... Oct. 2-4
Transportation Meeting, Toronto .Nov. 12-15
Annual Meeting, Detroit ..... Jan. 21-24

SALONS

Hotel Drake, Chicago ..... Nov. 9-16
Hotel Commodore, New York City .Dec. 1-7
Hotel Biltmore, Los Angeles ..... Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1